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EDUCATING TALENTS: EHANDBOOK OF METHODS AND STRATEGIES

Inclusive approaches to recognising and developing the potential of talented learners

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Prologue

Every learner should have the right to an education that supports them to reach their full potential. Every educator should also have the tools to identify these learners and support them to reach their full potential. You might have experienced in your classroom learners that you believe have talents and sometimes they are passing the whole education system unnoticed. It can be intellectual, artistic, entrepreneurial, technological, social, skillful handed or other skills. To recognise these learners and support, motivate, inspire, teach and guide these learners is a challenge without tools as an educator. This eHandbook gives you as an educator tools to recognise and support talented learners to reach their full potential.

Traditional teaching methods and pedagogies tend to aim for the main group of learners or to support the ones with difficulties in education in order to have the whole class pass a certain level. This may cause the talented learners to sit idle in class, having already done the tasks, doing the same but different tasks over and over. The teacher gives the learner the task to help other classmates or let the talented learner go out and have a break since the talented learner is already done instead of challenging and supporting the talented learner to reach further. This might lead to that the talented learner gets bored out, suffers from mental illness and eventually can this lead to drop out of school. This eHandbook gives you tools to recognise talented learners and twice exceptionals and we have gathered 6 different models to support educators to support talented learners.

Education is not only exclusive in schools during ordinary schedules, it is also not just about knowledge, practice and acquiring skills. It is also fostering self confidence and awareness, emotional resilience and a sense of belonging and to become an active citizen. That can also take place in other arenas then in the school. Science centers, museums, exhibitions, WorldSkills, Mensa, freetime activities and at home are some other places and organisations who work with education in other ways. Talented learners can also be supported in other ways and by other persons. You will get tools on how to support talented learners in other ways that can contribute to the education in school. This can give you a variety of tools and extra persons even outside school to support the talented learner to reach their full potential.

The Swedish Ministry of Education and the national inspectorate published, in 2018, a report highlighting a significant gap in education for talented learners. Discussions with educators from other countries confirmed that this lack of support is widespread across Europe. Traditionally, schools have focused mainly on helping students who struggle to reach minimum goals, while the needs of talented learners often remain overlooked. To address this, we gathered a team of experienced educators and spent over a year shaping the project's framework before submitting our application. We held extensive online and in-person discussions to develop the right approach and define clear, shared terminology. Our different backgrounds and cultures led us to agree on the terms "talented learners" and "educators". The Educating Talents project brings together educators who work within large organisations, schools or educational networks. Many of these educators hold leadership roles and have strong expertise in their fields. Some are recognised specialists in specific pedagogies, while others work closely with experts within their institutions. This combination of experience, leadership and specialist knowledge makes them uniquely qualified to shape practical strategies for supporting talented learners.

Every learner counts – whether in Austria, Belgium, France, Latvia, the Netherlands, Sweden or any other EU country. All learners have the right to a high-quality education, including those with advanced

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abilities. Supporting, guiding, challenging, motivating and inspiring talented learners is an important but demanding task for every educator. With this eHandbook, we offer practical tools, evidence-based strategies and proven models to help talented learners reach their full potential.

The eHandbook offers you tested models and pedagogies, practical steps and insights from six EU countries. To begin with “How to recognise talented learners and twice exceptional” followed by the six models “Case Methodology, Flex-Based Learning, Honors Pedagogies, Innovative Problem Solving, Kangaroo Methodology and Motivation Through Individualization”, you will have a variety of approaches to choose from. The variety of models makes it easier for you to choose a model that can be adopted into your education or classroom regardless of which school system you have in your EU country.

Encouraging educators across the EU to recognise and support talented learners since they may become the visionaries, innovators and leaders who will shape the EU of tomorrow. By using this eHandbook you will get tools to navigate in the complexity of recognising and supporting a talented learner and give the learner the opportunity to develop and grow their skills and competences with confidence. In the short perspective the individual learner will grow stronger but in the long perspective we build a stronger Europe.

This eHandbook would not have been possible to create without the dedication of all highly-experienced specialists, educators, teachers, learners, professionals and the steering committee of the Educating Talents project. A sincere thank you very much to all partners, schools, organisations, individuals who have participated in the teaching learning activities, specialists and professionals making this eHandbook come true. We are truly grateful to the Erasmus+ programme of the European Union for giving us the possibility to create this work and eHandbook the support educators to support Talented learners to reach their full potential.

Welcome to the eHandbook of Educating Talents, your guide to support talented learners to reach their full potential.

Explore the e-handbook via its interactive version	Find all of our videos on the Eduacting Talents Youtube Channel	Keep up with all our updates on Facebook

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Introduction

There are talented learners in every classroom, every school and every country. Many of them may remain unrecognised, unseen, unchallenged or even misunderstood. Educators often focus on helping students who struggle, while those with advanced abilities may receive limited opportunities to develop their full potential. This eHandbook is designed to change that by equipping educators with the tools and strategies necessary to support and challenge talented learners in diverse education with a variety of ways and methodologies that you as an educator can use.

Developed as part of the Educating Talents Erasmus+ project, this eHandbook is a result of international collaboration among educators, experts, specialists, teachers and institutions dedicated to support talented learners in their education. We have done testing, research, gathered best practices and practical case studies in order to give you as an educator an eHandbook for identifying and support talented learners in your school.

In a school, learners have the possibility to try new things and experiment. Through testing, they also need the freedom to fail. In failure you learn by your mistakes and improve. There are many examples of failures that became a success. So where to test, try and fail if not in school in order to make the learners succeed and be creative and make new innovations. Therefore we need to be open to different pedagogies and test and try out in classes in order to succeed. The talented learners that we mainly aiming for in this eHandbook are the ones in Upper secondary school, but can be adapted and used for other academic levels as well.

The eHandbook points out the importance of supporting talented learners and work inclusively with their development, including those who are twice exceptional. Through digital innovation, interdisciplinary approaches, and international insights, this guide provides a pathway for educators to implement effective, sustainable strategies to support talented learners in educators education.

This eHandbook serves as a practical resource for educators seeking to better understand and support talented learners to reach their full potential. It combines theoretical insights with handson strategies, presenting different pedagogical models tested in six different European countries. The content is structured to provide educators with adaptable approaches that can be integrated into different school systems and curricula, ensuring accessibility and tested to be used in your educational environment.

The **main goals** of this eHandbook are:

- ✓ To equip educators with pedagogical models that help talented learners reach their full potential.
- ✓ To provide strategies for recognising and supporting twice exceptional learners.
- ✓ To promote social inclusion by addressing the unique needs of talented students.
- ✓ To encourage the use of digital and blended learning as tools for talent development.
- ✓ To build a European Community of Practice where educators can share insights, challenges, and solutions.

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Supporting talented learners is not just about academic achievement, it is about preparing young people to become future innovators, leaders and contributors to society. Education should challenge all students to grow, think critically and develop their abilities in ways that prepare them for lifelong learning and success. By supporting talented learners, schools not only enhance individual learners' outcomes but also contribute to societal progress, innovation and sustainable development.

This eHandbook is a step toward restoring a more individual and flexible approach to education, an approach where every learners potential is noticed and supported. It offers you, as an educator, practical ways to adapt your teaching to each learners unique strengths and needs. It also reminds us that teaching is not just about guiding others, it is about growing ourselves, staying curious and being open to learning alongside our students. By working this way, we return to what education should be, a shared, meaningful process where everyone has the chance to thrive.

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Chapter 1: Strategies to recognise talented learners and twice exceptional learners

What is talent and what is the difference to giftedness?

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Talented, exceptionally gifted, intelligent… For all these terms, there are a great variety of definitions, which slightly differs from each other. We will successively define intelligence, giftedness and talent. Then we will focus on talent and Françoys Gagné's model (2021) to illustrate the differences between these terms.

We have chosen this recent model because it considers the influence of different environmental/external factors on the learner in relation to the influence of his internal factors on the development of his abilities over time. It also takes into consideration the talents present in all areas of life (Technique, Science and Technology, Arts, Social Service, Administration and Sales, Business Operations, Sports and Games) and not only the main school disciplines. Finally, this model is preferred because it takes into account the person as a whole.

What is intelligence?

There are a lot of different, but at the same time similar explanations. We can define the word intelligence as the capacity for abstraction, understanding, creativity, problem-solving, etc.

To shed light on the diversity of areas in which talents can develop, the model of multiple intelligences, developed by Gardner (1998), may be useful. While describing the different areas of intelligence separately, Gardner emphasises their interdependence. They should not be pitted against each other, which is still often the case in our culture. Although Gardner's theory has never been scientifically validated, we believe that it might be a good entry point for young people's learning. Focusing our good teaching practices on stimulating the different styles of intelligence can only be a plus in order to develop the skills of our young talents.

LINGUISTIC INTELLIGENCE	
Rich vocabulary	Interest in books, stories, poems…
Good linguistic expression	Preference for word games, rhymes…
High general knowledge	Tendency to create stories, poems…
MUSICAL INTELLIGENCE	
Rapid recognition of melodies	Good sense of rhythm
Differentiated perception of tones and melodies	Knowledge of one or more instruments (or desire to learn)
Quick and easy memorisation of melodies	Invent and compose own melodies

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LOGICAL- MATHEMATICAL INTELLIGENCE	
Good mathematical understanding	Good logical – analytical thinking
Arithmetic thinking	Good understanding of cause and effect
Easy/playful handling of numbers	Trying alternative solutions to mathematical problems
Early registration of quantities	
PICTORIAL-SPATIAL INTELLIGENCE	
Talent in drawing figures	Fertile imagination
Good three-dimensional thinking	Love of images, shapes, figures
Good ability to read maps and plans	Easy understanding of statistics, diagrams
PHYSICAL-KINESTHETIC INTELLIGENCE	
Talent for imitating movement sequences	Talent for movement in dance, sports…
Good development of gross and fine motor skills	Good body awareness and differentiated body schema
Handicraft	
INTRAPERSONAL INTELLIGENCE	
Independent identity and personality	Ability to reflect on one's own actions
High self-motivation and initiative	Good access to one's own emotional state
Autonomy and independent of thought	Differentiated self-concept (own strengths and weaknesses)
INTERPERSONAL INTELLIGENCE	
Predilection for social life	Good empathy
Talent for establishing and maintaining contacts	Good ability to advice and help
Leadership	Good ability to cooperate and manage conflict
NATURALIST INTELLIGENCE	
Interest in nature and landscape	Interest in environmental and ecological issues
Love for plants and animals	Investigation and classification of animals…
Love for nature-related subjects	Interest in evolution
EXISTENTIAL INTELLIGENCE	
Enthusiasm for philosophical discussions	Reflecting on questions of meaning
Processing of philosophical concepts and theories	Interest in ethical and moral standards of conduct
Treatment of the content of religions	Interest in existential questions of being

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What is giftedness?

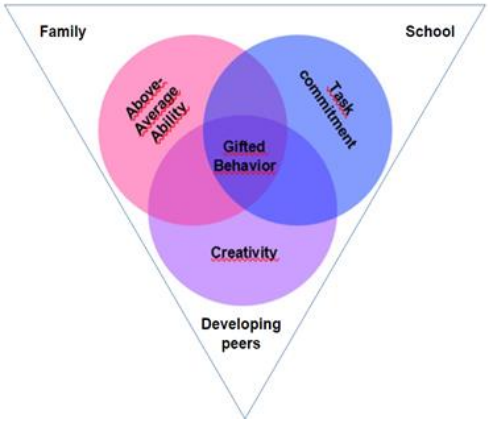
There are many theoretical conceptions of giftedness. Those of Renzulli (1978) adapted by Mönks (1992) and Gagné (2021) are two of the most prominent.

Renzulli, an American psychologist who specialised in the field of high intellectual potential, produced a model (1978) which shows that above average ability needs three factors to be realized : above average ability, task commitment (motivation) and creativity.

Subsequently, Franz Mönks (1992), a Dutch psychologist and founder of the ECHA - Diploma, completed this model by adding interaction with the environment, namely for the young person: family, school and developing peers.

Renzulli defined that gifted behaviour occurs when there is an interaction among three basic clusters of human traits: above average-general and/or specific abilities, high levels of task commitment (a real intrinsic motivation to carry out one's activities, perseverance in effort), and high levels of creativity (explore and experiment different ways to think and to play with ideas). Gifted and talented learners are those who possess or are able to develop this composite of traits and applying them to any potentially valuable area of human performance. As noted in the Enrichment Model, gifted behaviours can be found "in certain people (not all people), at certain times (not all the time) and under certain circumstances (not all circumstances)."

This achievement also depends on three environmental factors: the family, the school and developing peers. It is easy to see that the family environment is of primary importance in nurturing and developing a child's exceptional abilities. If a family, which is musically illiterate, is unaware of a child's musical ability, it will be very difficult for him to develop this talent in an environment that does not recognise it. As far as school is concerned, although some young people express their gratitude to the team that has surrounded their schooling or to one or two educators who have understood and encouraged them, there also are learners who have not felt encouraged or even recognised by their educators for their exceptional disposition. Finally, sharing with people, young or old, who have the same level of ability (developing peers) is essential as it allows the young person to feel less isolated and to confront others of similar strength, to see how they cope with challenges.



*THE THREE-RING CONCEPTION (*RENZULLI, 1978*)*

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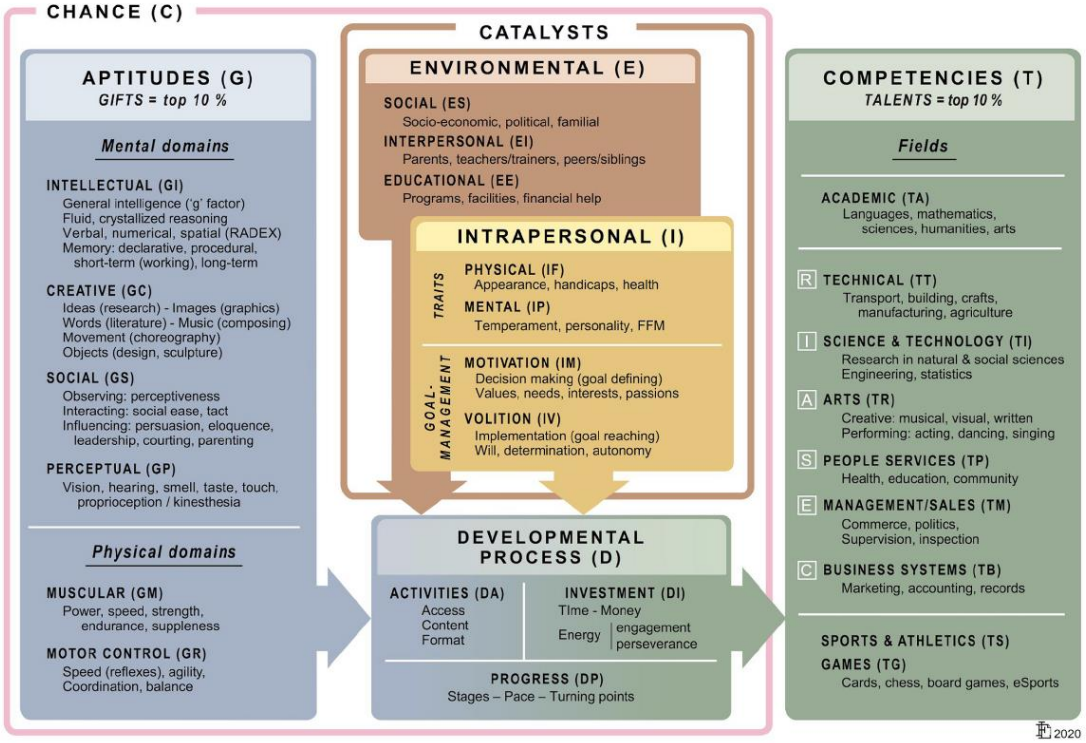
What is talent?

Gagné, professor of psychology at the University of Quebec in Montreal, in his Differentiating Model of Giftedness and Talent (MDDT) revised in 2021, distinguishes :

- gift or giftedness (in scheme G): remarkable natural aptitude in at least one skill area;
- and talent (in scheme T): remarkable knowledge and know-how in at least one field of human activity.

In this model (Gagné, 2021), the term giftedness designates the possession and use of untrained and spontaneously expressed natural abilities (called aptitudes or gifts) in at least one domain to a degree that places a learner among the top 10% of his or her age peers. By contrast, the term talent designates the superior mastery of systematically developed activities (or skills) and knowledge in at least one field of human activity to a degree that places a learner's achievement within the upper 10% of age-peers who are active in that field or these fields.

The model presents six aptitude domains: intellectual, creative, social, perceptual, muscular and motor control. Gagné identifies two catalysts: environmental catalysts (E) (social, interpersonal and educational) and intrapersonal catalysts (I) which are physical and psychological traits and motivation and volition (focus on goal achievement, self-control, autonomy, determination). In order to move from aptitude to talent, alongside the presence of catalysts, a developmental process (D) is needed: activities, investment of time and energy, and progress. Talent (T) in a specific field of activity emerges progressively during a long developmental (D) process that has its foundations in remarkable aptitudes (G, the gifts), and benefits from the constant of intrapersonal (I), as well as environmental (E) catalysts.



THE DMGT (*GAGNÉ, 2021*)

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Profiles of the gifted and talented individuals

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General characteristics

Exceptionally talented learners are as different as all other learners. They are far ahead of their peers in various areas of development and may be characterised by the following (*Gagné, 2005; Eyre, 2009; Webb and Latiner, 1993*). These talented learners can present various characteristics in their intellectual performance, work attitude and interests, and their social behaviour.

INTELLECTUAL PERFORMANCE BEHAVIOUR	
Learning at a faster rate	Sophisticated expressions
Highly detailed knowledge	Critically and independently thinking
Large range of vocabulary	Excellent memory capacity
Quick understanding	Ability to think logically
Accurately observation	Understanding of cause and effect relationships
High level of abstraction	
WORK ATTITUDE AND INTERESTS	
Quickly bored with routine tasks	Interest in adult topics
Not easily satisfied	Work independently
Very self-critical	Great commitment in solving tasks
SOCIAL BEHAVIOUR	
Often considered as individualists	Strong awareness of "right and wrong"
Often question authority	High level of empathy
Leadership qualities	Rejection of rules for the state of rules

As mentioned above, highly talented learners are just as diverse and heterogeneous as averagely talented learners... Quite a lot of scientists have dealt with the different "types" of talented individuals.

Specific profiles

After several years of observations, interviews, and reviews of literature, Betts and Neihart (1988) have developed six profiles of gifted and talented children and youth. These profiles help educators and parents to look closely at the feelings, behaviour and needs of the gifted and talented.

Type I: The Successful

Learners who are Type I learn well and are able to score high on achievement tests and tests of intelligence. They are sometimes said to have learned the system. As a result, they are usually identified for placement in programmes for the gifted. Rarely do they exhibit behavioural problems because they are eager for approval from educators, parents and other adults. These are the learners many believe will "make it on their own." However, they often become bored with school. But they are usually liked by their peers and are included in social groups.

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Type II: The Challenging

Type II's are the divergently talented. Many of them are not recognised as highly talented in the school system. They possess a high degree of creativity and may appear to be obstinate, tactless or sarcastic. They quite often question authority and may challenge the educator in front of the class. They often do not conform to the system. Neither have they learned to use it to their advantage. Their interactions at school and at home often involve conflict. They sometimes struggle with their self-esteem. They often challenge their peers and are therefore often not included or welcomed in activities or group projects.

Type III: The Underground

The Type III talented learner is known as the "underground gifted". In general, these are very often girls aged 12-15. They begin to deny or hide their talent to feel more included. They frequently feel insecure and anxious. Their changing needs are often in conflict with the expectations of educators and parents. All too often, adults react to them in ways that only increase their resistance and denial. So they benefit most if they are accepted as they are – without any pressure. If a gifted boy goes underground, it tends to happen later (16-18 years old).

Type IV: The Dropout and underperformer

Type IV talented learners are often angry. They are angry with adults and with themselves because the system has not met their needs for many years and they feel rejected. They may express this anger by acting depressed and withdrawn. They often have interests that lie outside the realm of the regular school curriculum and they fail to receive support and affirmation for their talent and interest in these unusual areas. These are often older learners who attend school sporadically or only on certain days and have very often already "dropped out" emotionally, mentally and physically. Their self-esteem is mostly very low. They are bitter and resentful as a result of feeling rejected and neglected. They might put themselves in danger. Family counselling is strongly recommended and the Type IV youth should also be given individual counselling.

Type V: The Twice exceptional

Type V refers to talented learners who are physically or emotionally handicapped in some way, or who have learning disabilities which may involve sensory, physical, motor or cognitive disabilities (*Foley-Nicpon & Candler*, 2018). The vast majority of talented programmes do not identify them, nor do they offer differentiated programming that addresses and integrates their special needs. Type V learners do not exhibit behaviours that schools look for in the talented. They may have disruptive behaviour that makes it difficult for them to complete work. They also show symptoms of stress; they may feel discouraged, frustrated, rejected, helpless or isolated. These learners may deny that they are having difficulty by claiming that activities are "boring" or "stupid." They want to avoid failures and are unhappy about not living up to their own expectations. They are often impatient and critical and react stubbornly to criticism. And yet these young people have enormous assets: they relate easily to others, they have a conceptual way of thinking, they like solving problems and are attracted to novelty and complex ideas.

Type VI: The Autonomous

The Type VI is the autonomous learner. Like the Type I's, these learners have learned to work effectively in the school system but their motivation is intrinsic. They do not work for the system, they make the system work for them to create new opportunities. Type VI's have strong, positive self-concepts because their needs are being met. They are successful and they receive positive attention and support for their accomplishments

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as well as for who they are. Type VI learners are independent and self-directed. They realise they can create change in their own lives. They are able to express their feelings, goals, and needs freely and appropriately.

A specific talented learner's profile : twice-exceptional learners

Three different profiles exist within this category of learners.

- Learners identified as talented and whose talents masks the disorder/deficit:
  These learners redouble their efforts, use compensatory strategies, or are faced with easy learning. However, as school activities become more complex, they find it increasingly difficult to compensate. The disorder/deficit may remain invisible and academic difficulties are then attributed to other factors (lack of motivation, intolerance to effort, adolescence, temperamental behaviour, etc.).
- Learners with a disorder or deficit that masks talents:
  The family and/or educational team emphasise the difficulties created by the disorder or deficit. The learner's strengths are not considered or even made apparent.
- Learners whose talents and deficit/disorder are masked:
  Neither the deficit/trouble nor the talent has been noticed and is therefore not considered. The learner feels both overwhelmed by the academic difficulties that are bound to accumulate as he/she goes through school and frustrated because he/she feels that he/she could do much better. Because talented learners who do not perform well may have unidentified learning disabilities (*Baum et al., 1998; Baum and al, 2001*), it is important to consider the possibility that a specific learning disability may be responsible for a learner's underperformance. (*Reis and Mc Coach, 2022*). To help these learners, educators can encourage compensatory strategies, promote awareness of strengths and weaknesses, focus on the development of the youth's giftedness and/or talent, and provide an environment that values individual differences.

Massé et al. (2021) described specific and nonspecific characteristics of twice-exceptional learners. But it is also important to note that there are as many profiles as there are twice exceptional learners.

SPECIFIC CHARACTERISTICS
Appear more intelligent than their academic performance suggests
Develop uneven academic skills (excel in one area and weak in others)
Have inconsistent academic performance
Use sophisticated vocabulary when speaking, but their written expression appears weaker
Have creative ideas but have difficulty organizing their ideas or tasks
Easily understand concepts but frustrated by their inability to achieve tasks
Well participate in class discussions but lack of concentration in oral courses
Have difficulties to follow courses instructions
Need sufficient or extra time to complete tasks
May perform better on more difficult tasks than on easy tasks
Show low self-motivation, effort for academic tasks andself-esteem
Use mechanisms to compensate their deficits
Are easily tired because are constantly compensating for their difficulties
Have some deficits in executive function (inhibition, flexibility, planning)

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NON SPECIFIC CHARACTERISTICS
Are very self-critical or perfectionist
Have unrealistic expectations of their performance
Exhibit disruptive behaviour in class
Display poor social skills and fell isolated
Need unusual support from parents for school work and/or social interaction
Are hypersensitive

Recognition by the educators or/and the parents

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By looking closely at the behaviours and feelings of talented learners, more and sometimes better educational programming may be developed to meet their diversified needs. It seems to us absolutely essential that educators and parents understand the cognitive, emotional and social needs of talented learners.

Parents and educators may use the characteristics and the different profiles presented above to gain a deeper awareness and understanding of talented learners. They can also discuss with these learners about these profiles and their feelings about their schooling and their relationships to know them better and identify their needs. Furthermore, two full questionnaires are available in the appendix section to help educators to recognise characteristics observable in classes for learners with specific attitudes and high skills and for twice-exceptional learners.

Educators will therefore be able to observe and recognise more easily the different talents of their learners. Firstly, they will be able to recognise talents related to the general subjects such as mathematics, language, science… which mainly belong to the intellectual and creative mental fields. Secondly, they will be able to recognise talents related to technical and vocational courses in the qualifying education options, which belong to the intellectual, creative, perceptual mental domains and to the physical muscular and motor control physical domains. Thirdly, they will be able to recognise talents related to talents that are mainly exercised outside school and are less obvious to detect but whose recognition is a lever we can use to encourage our talented learners (extra-curricular activities).

Identification by Psychologists

The identification of giftedness is carried out by psychologists or neuropsychologists through a comprehensive evaluation that includes several steps and lasts several hours. The first step involves conducting a medical, family, social, and school history with the talented learner and their parents. In the second step, the psychologist will propose the completion of questionnaires regarding cognitive, academic, emotional, social skills, and behaviour by the parents, the educators, and the learner. The third step consists of administering psychometric tests (which vary by country). These tests allow the evaluation of different cognitive domains related to the concept of intelligence. Although they do not take into account talents in

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other areas (perceptual, social, artistic, athletic, manual...), these tests highlight where the talented learner's intellectual abilities stand compared to the norms (representative samples of learners of the same age). If the results obtained are above the norms, the psychologist can then determine whether the learner is gifted, has very good abilities, or has notable strengths in certain skills but not in all. Finally, through the quantitative and qualitative analysis of the history, questionnaires, tests, and the learner's behaviour throughout this process, the psychologist can then provide their conclusions to the learner and their parents.

If you would like to learn more about identification by psychologists

Download the Chapter 1's appendix

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Chapter 2: Pedagogical models and methodologies

Entering the chapter of our main focus we have had in this eHandbook, we proudly present our tools for educators to support Talented Learners to reach their full potential. The different methodologies and pedagogies that have been chosen, tested and developed. The following chapters present different methodologies and pedagogies that you as an educator can choose from. You will find 6 different methodologies and pedagogies because they all aim for different needs and have different approaches. You can therefore choose the one or ones suitable for your needs and your conditions. Just as a carpenter needs the right tools to easier build a bookshelf, house or a castle, you as an educator also work easier or if I may say, smarter, when you have the right tools to support talented learners. Don´t work hard, work smart. There is not only one tool for the carpenter nor for you as an educator, since the needs can vary you need to have a variety of tools in your toolbox.

The six different methodologies and pedagogies are presented in this chapter along with practical advices to you as an educator.

- ✓ Case Methodology combines several subjects into one case with real-life scenarios, dilemmas or questions that encourage analytical reasoning and problem solving.
- ✓ Flexbased learning develops scientific creativity by using flexible thinking tasks, hands-on experiments and tools to reflect and explore multiple solutions in STEM subjects.
- ✓ Innovative Problem Solving prepares learners to tackle real sustainability challenges by combining creative thinking, strategic planning and teamwork in projects linked to the Sustainable Development Goals.
- ✓ Honours pedagogy motivates and encourage curiosity and independent thinking with guidance and support from the educator or mentor.
- ✓ The Kangaroo Methodology presents three steps focusing on identifying, assessing and developing the abilities of talented Learners through tailored strategies.
- ✓ Motivation through individualisation presents several different teaching methods and practical advices to motivate talented learners.

Every subchapter starts with the theory to make it easier for you as a reader to navigate and get the core right at the start of the sub chapter. Followed by a more practical part presenting the strategy of implementation. In this part you will get more hands on suggestions and solutions of how the methodology or pedagogy works. To work with the methodology or pedagogies you need to have the practical set-up conditions. Therefore we also have a part for each subchapter presenting how you practical arrange for using that methodology or pedagogies.

To know if this is a suitable methodology or pedagogy for you means that you need to test and try it out. That takes a lot of time and effort. In the project of Educating Talents we have tried the methods and pedagogies out for you to get the insight of how learners and educators feel about it. The testing has been made in six countries by the educators taking part of the projects experimentation phase. This can help you in the decisions you need to make choosing your right tool. For every subchapter you will find how do learners feel about it and how do educators feel about it.

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Case Methodology

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Late professor Roland C. Christensen of Harvard Business School (HBS), world leading authority on case methodology in the 20th century, described case method teaching as "the art of asking the right question, of the right learner, at the right time, and in the right way" (*Christensen, 1991, p. 3*). Since case methodology's inception at HBS in the 1920s, the method has been a cornerstone of participant-centered learning, challenging learners to analyse real-world dilemmas, engage in discussion, and develop their decision-making skills.

The case methodology was originally designed to prepare business leaders, and has since found success in a wide array of disciplines, including medicine, law, engineering, and education (*Bruner, 2002; Christensen, Garvin, & Sweet, 1991*) all over the world. It is now increasingly recognised as an effective instructional approach for learners who thrive in intellectually stimulating environments that emphasise problem-solving, critical thinking, and creativity. The Harvard cases present unresolved, thought-provoking situations that require learners to assess multiple perspectives, formulate arguments, and take ownership of their learning process (*Harvard Business School, n.d.*).

Founded in 2000, Sjölins Gymnasium is a Swedish upper secondary school with schools in Stockholm, Gothenburg, and Malmö. As part of the independent school group AcadeMedia, Sjölins offer university preparatory programmes with a strong focus on academic excellence. A defining feature at Sjölins is its use of the case methodology with a high level of learner participation, as well as strong learner-educator relationships which are at the core of our educational philosophy. By maintaining close and supportive interactions, we create a dynamic and inspiring learning environment that prepares learners not only for higher education but also for a future of lifelong learning (see https://www.youtube.com/watch?v=H-JR0a4Da0g&t=7s)

This chapter explores how the Sjölins Case Methodology has been introduced and tested in an international educational context. Through the Erasmus project *Educating Talents*, educators from our European partner schools participated in structured learning activities to engage with the methodology (i.e. teaching learning activity (TLA)). These activities included lectures on theoretical foundations, participation in case-based discussions, classroom observations, and hands-on workshops. Following these sessions, participating educators implemented the case methodology in their own classrooms, testing one or more Sjölins Cases over several months. Their experiences were systematically evaluated through reflections, classroom observations, and learner feedback. In addition, participants attended a Zoom meeting to share insights, discuss challenges, and refine their approach. Their final feedback was collected through a questionnaire addressing reflections on their testing of the case methodology with regards to educating talented learners, both from the educators, as well as the learners, perspective. The results of this cross-cultural collaboration provide valuable perspectives on the impact of case methodology in different educational settings and its effectiveness in supporting talented learners.

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The Theory

At Sjölins Gymnasium, the adaptation of the Harvard Case Methodology has proven to be a powerful tool in fostering engagement, deep learning, and intellectual independence among learners. This method, which aligns with problem-based learning principles, has been particularly impactful in addressing the needs of talented learners, who often benefit from open-ended, complex challenges that encourage metacognitive processing (*Egidius, 1999*). Research has shown that case-based learning strengthens long-term knowledge retention, enhances problem-solving abilities, and promotes leadership and communication skills (*Kjellén, Lundberg, & Myrman, 1994; Stjernquist, 2001*). Sjölins Case periods are reality-based and interdisciplinary, designed to connect subject knowledge to real-world dilemmas. Each case period is built around a central question or dilemma drawn from real-life situations, where the knowledge learners acquire becomes a tool for understanding complex realities. This approach fosters creativity, independent thinking, collaboration, and a holistic understanding of knowledge. A defining feature of the Sjölins Case Methodology is its interdisciplinary approach. Educators collaborate across subjects to analyse and investigate a shared case, theme, question, or dilemma from multiple perspectives. A well-designed case period includes a clear thread that ties different subjects together, helping learners to see connections between disciplines. While not every case needs to integrate multiple subjects, educators must be able to relate their subject matter to others, ensuring that learners develop a broader and more nuanced understanding of the topic.

Before further discussing what the Sjölins Case Methodology is and how it can be applied, one needs to have a basic understanding of the framework and vocabulary used in the planning and execution of such cases.

Key Concepts in a Sjölins Case Period

- **Sjölins Case period:** A period (typically several weeks) with a coherent theme and interdisciplinary education. The case period could be a structured scenario focusing on a Sjölins Case or a more open-ended situation, such as a dilemma or a broad question.
- **Case Introduction:** The starting point of the case period, where the overarching case, a scenario, question, or dilemma, is presented to the learners. The case introduction should spark learners' curiosity and foster engagement for further exploration and study within the case period.
- **Sjölins Case:** A written case description featuring a narrative that emphasises authenticity, multiple perspectives, and an open-ended conclusion to encourage reflection and analysis. A Sjölins Case is a complex story with a broad content that can be used in several ways depending on what core learning objectives the educator chooses to focus on. (*See Appendix 1*). The form of a Sjölins Case is adapted from the form of a traditional Harvard Case.
- **Case Seminar:** An educator-led session where a Sjölins Case is discussed orally in a seminar setting. It can serve as a learning opportunity or an assessment moment. While planning the case seminar the educator decides which core learning objective to focus on during the seminar.
- **Teacher's Guide:** A guide for a Sjölins Case period that includes key content, suggested materials, and methodological support. (*See Appendix 2*)
- **Case Log:** A tool used during the case introduction, scenario analysis, or ongoing work to help learners understand and structure the content. (*See Appendix 3*)

There are many ways to describe the case methodology, but a good foundation for understanding the methodology is the explanation of Laurence E. Lynn, Jr.'s in *Teaching and Learning with Cases* (1999). Lynn's explanation is as follows:

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The case method of teaching is the set of pedagogical techniques and 'tricks of the trade' that instructors use in the classroom to help learners reach specific learning objectives with the teaching case as a basis for discussion. In the real world, the solutions to complex problems cannot be found in textbooks, nor will everyone agree on the "right answers" to difficult questions. The case method prepares learners for a world that demands critical thinking skills and the ability to create convincing arguments, often with little time and incomplete information.

The above explanation helps us to better understand that the use of case methodology is not necessarily replacing a lot of our otherwise useful methods of teaching. However, the case methodology is meant to help incorporate the real world into what we teach and can be used as a tool to better reach learners with our other pedagogical tool sets. It is used to elevate the teaching from simply parroting an educator to critically apply what has been taught. Part of case methodology is therefore focused not only on the learners' achievements in the classroom but also in their future work life. The case methodology fosters active learner engagement and intellectual curiosity, counteracting passivity and motivating learners to immerse themselves in the case dilemma with high levels of motivation and dedication.

Strategies of implementation

The implementation of a Sjölins Case period involves several steps. The case period is based on a real event, situation, or dilemma and integrates multiple subjects and lasts over several weeks, i.e. six weeks. During the case period both educators and learners tackle three different phases; an *introductory phase* where the central question or dilemma is presented, an *exploration and investigatory phase*, and a *conclusion phase* that ties back to the question and summarizes what has been learned.

Introductory Phase

The purpose of the introduction of the case period is to present the central question, spark interest, and connect with learners' initial thoughts, opinions, and interests on the topic. This can be done through several different means and this flexibility allows the educator to better adjust the education to fit the needs and interests of the learners. A case introduction may start from the get-go with the material in question, news articles, documentaries, radio shows or any other material deemed interesting enough. Once the activity is finished it is customary for the educators to allow the learners to discuss what they have seen, heard or experienced with each other in smaller groups, i.e. the case groups. This allows for the learners to better specify what they understood and their views on the material and an introduction usually ends with an educator led whole class discussion on what the learner thought of the material, what questions they may have, what they need to know more about in order to further their own understanding of the issue at hand. During this phase a case log (see Appendix 3) can be used to structure the content, and also to summarize what the learners already know and what they need to know in order to solve the central question or case dilemma. In the introductory phase of a case period, authenticity is one of the biggest reasons for learner enthusiasm, since the learner may have heard of the topic on the news or seen it on social media. The authenticity in this case is the fuel that is ignited out of curiosity outside of the classroom. Hence, by the end of this introduction the learners should leave wanting to know more about the topic and therefore also the school subjects related to it.

Exploration and Investigatory Phase

The aim of this phase is for learners to gain new knowledge through varied teaching methods, enabling them to address different aspects of the question from multiple perspectives. This phase incorporates

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continuous assessments, Sjölins Cases, other types of case studies, field trips, and guest lectures. The different types of assessments could for example be written exams, multiple choice-tests, essays, etc. Depending on your classroom situation, the interdisciplinary nature of case also opens for the possibility of having educators of different subjects present at the same time, as it is preferable to visit each other's classes in order to have a better understanding of what the learners are working with. The Sjölins Case, interwoven with the interdisciplinary aspects of the Case period, provides learners with the opportunity to explore the case from multiple perspectives, often leading to engaging discussions between learners and educators.

The Sjölins Case

A Sjölins Case is usually a short written narrative that emphasises authenticity, multiple perspectives, and an open-ended conclusion to encourage reflection and analysis. A Sjölins Case is a complex story with a broad content that can be used in several ways depending on what core learning objectives the educator chooses to focus on. (See Appendix 1). The form of a Sjölins Case is adapted from the form of a traditional Harvard Case.

When working with the Sjölins Cases, there are some fundamental principles to adhere to. These principles are described below.

- **Authenticity:** A Sjölins Case that follows the Harvard model is based on something that has actually happened or is happening right now, such as a medical case, a legal dispute, or a business-related problem. A case can also be fictional, to a greater or lesser extent inspired by real events. The aim is for the case to feel authentic and relevant to the learners. In the introductory phase (explained above) of a Sjölins Case, the authenticity is one of the biggest reasons for learner enthusiasm, since the learner may have heard of the topic on the news or seen it on social media. The authenticity in this case is the fuel that is ignited out of curiosity outside of the classroom. It can also be beneficial if the case has a professional connection, meaning that learners can discuss it from a professional role perspective. This is naturally more challenging when learners do not yet have a professional identity to rely on. However, having a career-oriented perspective, for example, based on the learners' field of study, can still increase engagement and serve as useful preparation for future career choices. Therefore, Sjölins Cases are best performed when there is a clear authenticity. Authenticity has a strong connection to what the learners are expected to do outside of the classroom, in the "real world". It is a controlled environment in which the learners can experiment and see their knowledge be put to use (*Lynn, 1999*).

- **Narrative:** The case should be a story, not just a list of facts. The narrative needs to include descriptions of the actors and the context in which the story unfolds, such as the time and place in which it occurs. This can create greater engagement and help learners consider different perspectives.

- **Perspective:** Cases differ from many other types of narratives in that they are clearly actor-oriented. A case is not an objective story seen from an external viewpoint but rather a narrative told from someone's perspective. When the story ends, it is often up to that person to make a decision or take some form of action. There should be more than one way to view the case's issues, conflicts, or dilemmas. One goal of the case is for learners to be able to shift perspectives and learn to see things from different angles. The dilemma must not have an obvious solution or seem too

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trivial for the learners. Ideally, the case should have multiple layers, allowing learners to practice identifying and switching between different perspectives. For example, a decision could have social, economic, or political consequences, or causes at the individual, group, or societal level.

- **Open-Ended Conclusion:** The case itself should end before a decision is made or before something crucial in the story occurs. This way, it is up to the learners to find different solutions and courses of action. There should be room for multiple interpretations. It must not be obvious how someone should or will act in a specific case situation. It is important for learners to reflect on different courses of action and the potential consequences of each choice.

The Case Seminar

A case seminar is perhaps the most common way to discuss or present a Sjölins Case. But how should a case seminar be conducted in practice? Many different variations are possible. While planning the case seminar the educator decides which core learning objective to focus on during the seminar. Energy levels are often highest at the start of a lesson, and as an educator, you should take advantage of this to give the discussion a strong start.

Key Considerations Before the Case Seminar:

- Group Size - Should the entire class participate at the same time, or should it be divided into smaller groups?
- Seating Arrangement - How should the classroom be arranged to best suit the purpose of the seminar? At Sjölins, learners are often seated in an open U-shaped arrangement to encourage interaction and visibility.
- Whiteboard Use - Should the whiteboard be used? If so, what specific boarding structure should be used?
- Mobility - Should the educator be able to move around the room, or should they stay in one place?
- Guidelines - Are there specific expectations for learners during the seminar? The most common guideline is that learners should not raise their hand when someone else is talking.
- Expectations - Communicate high expectations to the learners by, for example, expecting them to be fully prepared, hence starting the seminar without summarizing the preparation material.

Another important aspect to consider is whether learners should be allowed to bring laptops or notes to the seminar. Discussions often suffer if learners hide behind their screens, searching for pre-written answers instead of engaging in active dialogue.

Careful attention should be given to the questions posed, especially the opening question. A strong opening question fosters engagement, curiosity, and a desire to discuss. The importance of a well-crafted opening question should not be underestimated. It is worth reflecting on it in advance, possibly even discussing it with colleagues.

Types of Sjölins Case Seminars

Depending on the core learning objectives, the case seminars could fall into one of the following categories:

Semi-Structured

- The educator prepares an opening question and possibly a few additional questions.

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- There is no strict or detailed plan for every part of the seminar, but rather a clear sense of its intended conclusion, the learning objectives, and the overarching 'story arc'—a flexible yet intentional structure that allows the discussion to evolve organically based on learners' contributions, while still ensuring alignment with the case's overall goals.
- Requires an educator who is comfortable with improvisation and skilled at keeping the discussion alive.
- The whiteboard is used to capture key concepts.

Structured

- The educator prepares guiding questions and writes pre-defined headings on the board for each pasture, i.e., each distinct part of the seminar.
- A general order of discussion is planned in advance, though deviations are welcomed as long as the conversation remains meaningful and forward-moving.
- While the discussion itself is spontaneous, learners have the opportunity to prepare for each pasture beforehand.

No single approach is inherently superior, the key is to carefully consider the intended outcome of the case seminar. Within the flexibility of the case methodology, the format should be deliberately chosen to support the session's purpose, be it an open-ended learning opportunity, a formative assessment, or a more structured examination. The choice of structure may also be informed by the learners' prior knowledge and readiness to engage with the material. Different formats serve different functions and should be aligned with both the objectives of the case and the characteristics of the learner group.

The Educator's Role in a Case Seminar

The educator's role in a case seminar differs from that in a typical classroom setting. The main focus is to challenge all learners, encouraging them to take a stance, react, and engage in dialogue. Within the case methodology, the educator takes on the role of a facilitator during the seminar, adapting dynamically by listening actively and with genuine curiosity. Rather than steering the discussion unilaterally, the educator remains responsive to learners' input, allowing their perspectives to influence and guide the progression of the seminar. The educator should also ensure that learners build upon what others have said, helping the discussion to progress and deepen. One more important aspect is to make sure that all learners are heard during discussions.

Types of questions the educator could use to facilitate a Sjölins Case Seminar

Questions to start an activity: Frame learners' attitudes toward a case by asking for one of the following:

An **assessment** (of the situation)	"How serious is the situation?"
A "diagnosis"	"What is the *biggest* problem X will face?"
A **recommendation** on what could be done	"What would you recommend X to do in this situation?"

Questions to follow-up/probe during the discussion: There are mainly three types of follow-up questions:

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Dig deeper to seek more depth in the discussion	“What led you to this conclusion?”
Open up for more opinions, thereby moving “sideways”	”Are we missing anything from today's discussion?”
Tie things together by asking for generalisations, reflections, etc.	"What are your takeaways from today's case seminar?"

Transitions: Questions aimed at connecting one “pasture” to the next. The educator can ask questions to check learners' understanding before the seminar continues.

Questions to handle challenges in the classroom: An educator needs to deal with contributions that risk leading the discussion away from the intended learning objectives or getting “off track”. This can also include handling comments that are too lengthy, incorrect, confusing, or inappropriate/offensive.

Conclusion phase

The case conclusion phase serves to summarize what has been learned about the central question, theme or dilemma of the case period. It is not uncommon to end a case period on a higher note, and at times it is directly related to the start of the case period. The case conclusion could be a more complex assignment where all the different subjects of the case period are included, hence, this showcases and emphasises the interdisciplinary aspects of the case education. Also, it is of great importance that the case period is thoroughly evaluated by both educators and learners in order to maintain the high quality of the case periods. The conclusion phase could for example include a case seminar, a presentation, a debate or a podcast.

Setup conditions

Case methodology is reliant on one thing in particular, planning. Especially when used in a Sjölins Case period where there is supposed to be at least two different subjects involved. How this planning time is divided may take on different forms at different schools and can range from two hours till fourteen hours of casework every week for six weeks. Although it is quite easy to share cases with each other, between both educators and schools, a lot of focus has to be placed on becoming familiar with the material. The need for authenticity also requires the educator to stay updated on the world around them, something which seldom seems to be an issue for our profession. Furthermore, to successfully implement this approach, the educator needs not only general knowledge about the surrounding world, but also the ability to think critically, demonstrate facilitation skills, and guide inquiry-based learning.

Nice to have on the other hand, are a plethora of things. Some of which include the location for case seminars, plenty of board space, and scheduling. The locations are important in order to create a learning environment which emphasises the contribution of the learners. The opportunity to have an inviting classroom is essential for learning with the case methodology as the purpose revolves around understanding the learners’ different views on the subject matter. The use of the board is also connected to the Sjölins Cases as it helps structure the seminar for the learners and makes sure that the learners follow their plan through the different pastures. The scheduling is essential for all parts of a Sjölins Case period as it offers opportunities to create more exciting teaching situations, and engaging case studies.

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Model conclusions and recommendations

To assess the impact and applicability of the case methodology, educators from our European partner schools took part in a series of structured professional development activities, i.e. TLAs. These included both theoretical and practical components, followed by implementation of the methodology in their own classrooms over several months. Through reflections, classroom observations, learner feedback, and collaborative discussions, participants contributed valuable insights into how the method functions in diverse educational settings. The following section summarises the key findings from this process, highlighting its potential to support talented learners across Europe.

How do educators and learners feel about it?

The key findings from the evaluation process are summarized as follows:

Enhanced engagement and participation - The participating educators reported that the cases they tested significantly boosted learner engagement. Real-world scenarios sparked curiosity and made learning more meaningful, particularly for talented and twice-exceptional learners. Learners appreciated the opportunity to work at their own pace and explore topics aligned with their interests, resulting in more autonomous and motivated learning. Quote from two TLA educators: “As the learners had the opportunity to work at their own pace and to focus as much as they wanted on topics they were interested in, most of them tended to be very motivated” and “I was highly impressed by the motivation of the pupils during the case. They developed creative solutions and were quite motivated”.

Improved educator-learner interaction - The methodology fostered deeper educator-learner connections, as educators transitioned from traditional instructors to facilitators or coaches. This shift allowed educators to support learners more individually and encourage richer, more inclusive classroom discussions. Quote from a TLA educator: “The model shifted my role from lecturer to facilitator, guiding discussions rather than providing direct answers. While it sometimes required extra planning, the deeper engagement and critical thinking skills learners developed made it a valuable and enriching teaching experience”.

Increased participation of quiet and diverse learners - Educators consistently observed greater participation from typically quieter learners. Structured discussion formats and clear rules for interaction helped create a safe environment where all voices could be heard. Learners with ADHD, dyslexia, or autism were also able to engage meaningfully through multimodal participation, such as visual aids, role play, or written reflections. Quote from two TLA educators: “I was surprised that the most quiet girl in the group spoke out. This was possible because of the rule that you don't interrupt, but also put up your hand after someone is ready, not during. That gave clarity and safety for the learners” and “For twice-exceptional learners, the Case Methodology helped them use their strengths while supporting their challenges. Real-world stories kept them engaged, and different ways to participate - talking, drawing, or acting - made learning easier. Clear structure helped ADHD/ADD learners stay focused, dyslexic learners shared ideas verbally. This method encouraged deep thinking, teamwork and problem-solving”.

Adaptability across subjects and educational levels - The case methodology was successfully applied in English, Social Studies, Geography, and interdisciplinary projects. While some learners initially faced challenges designing or translating cases, the approach proved flexible and adaptable, even for younger

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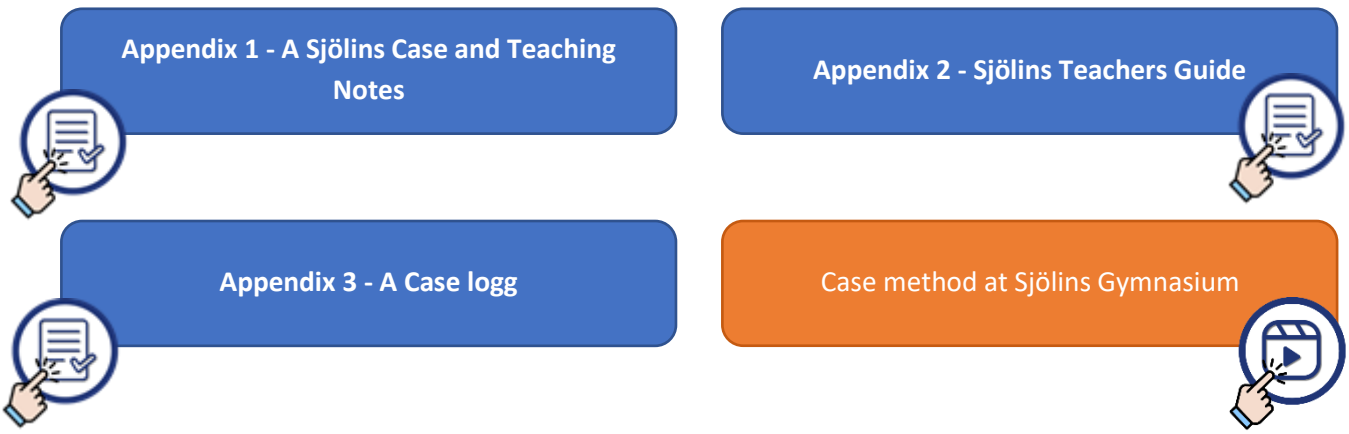
learners aged 13–15. Educators either used pre-existing cases from Sjölins or created their own based on the same principles.

Support for social-emotional and collaborative skills - Through peer discussions, role plays, and group problem-solving, learners developed key competencies such as communication, empathy, emotional regulation, and teamwork. The method encouraged learners to consider diverse perspectives and respectfully debate complex dilemmas, enhancing both their cognitive and emotional development.

Positive response to autonomy and responsibility - Learners responded well to the freedom within the structured framework of the case. Talented learners especially benefited from the opportunity to explore issues in greater depth, lead discussions, and propose creative solutions. For some learners, representing another person's viewpoint in role-plays made it easier to understand and accept differing opinions. Quote from a TLA educator: "Talented learners led discussions by analyzing the case from multiple perspectives, debating causes and consequences, and proposing solutions. They asked thought-provoking questions like "How can we encourage learners to speak up?" and explored ideas such as peer mentorship, anonymous reporting systems, and empathy-building activities. By facilitating debates and considering diverse viewpoints, they ensured the discussion was insightful and action-driven".

Challenges and areas for improvement - Some challenges were noted, such as managing dominant voices, supporting less experienced learners, and adjusting to the educator's new role as facilitator. In a few cases, emotional investment in sensitive topics required additional scaffolding. Nevertheless, most learners adapted quickly to the methodology, and educators found that concerns about time constraints or unfamiliarity were largely unfounded.

In conclusion, the introduction of the Sjölins Case Methodology in general, and Sjölins Cases in particular, within the Educating Talents project, has demonstrated strong potential to enhance learner engagement, foster critical thinking, and provide meaningful support for talented and diverse learners. While challenges exist, the overwhelmingly positive feedback from participating educators suggests that case-based learning holds significant potential for modern, inclusive pedagogy. Continued refinement and adaptation of the methodology will further strengthen its impact, ensuring that learners across Europe benefit from this innovative approach to teaching and learning.



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Flex-Based Learning

A Programme to Foster Scientific Creativity in Schools

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The theory

In a world of increasing globalization and technological progress young people must learn to solve real problems for which there are no ready-made strategies to shape tomorrow's world in an innovative, resource-conserving, and sustainable way (*Kind & Kind, 2007; Marope et al., 2017*). Therefore, in many curricula, the so-called 21st Century Skills (*Partnership for 21st Century Skills, 2015*), which include for example creativity, critical thinking and problem-solving, are anchored.

Especially in the field of gifted education, the call to promote creativity is becoming louder and louder. Gifted learners exhibit exceptional intellectual abilities as well as a high level of curiosity. Fostering their scientific creativity strengthens their ability to critically evaluate information, make connections between different concepts and develop novel approaches to challenges. This enables them to tackle complex problems with confidence and ingenuity.

To foster learners´ creative problem-solving skills and to transform schools into innovative think tanks and maker spaces, a team of researchers and educators at the University of Education Upper Austria, led by Kurt Haim and Wolfgang Aschauer, established the SCHOOL OF CREATIVE SOLUTIONS (SCS) as an international school network for creative problem-solving. For implementation in schools, SCS comprises two special learning and teaching programmes – FLEX-BASED LEARNING (FBL) & INNOVATIVE FOCUS (InFOCUS) – including together a bundle of over 20 techniques.

The FBL programme (*Haim & Aschauer, 2022*) was developed specifically for STEM subjects to promote aspects of scientific creativity like divergent thinking. Because this programme does not only promote flexibility, in future the programme will be called SCIP (Scientific Creativity in Practice).

The InFOCUS programme was designed to foster learners to challenge realistic problems. Therefore, this programme trains learners not only in different creativity techniques, but also in creative project management.

The SCS is intended to be a platform for all those who are firmly convinced that school can be much more than a place of pure knowledge transfer. School should be a place of creative work and problem solving. The visions of the SCS are:

- Learners who face the challenges of the future with optimism and self-confidence.
- Educators who can initiate innovative processes in the school.
- Schools who establish themselves as a think tank and maker space for the challenges in the context of the "Sustainable Development Goals".

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Scientific Creativity

The concept of scientific creativity is significantly influenced by Guilford and Torrance and can be interpreted as a domain-specific creativity that includes both domain-specific and general creativity competencies (*Hadzigeorgiou et al., 2012; Hu & Adey, 2002*).

Scientific Creativity	
Domain-Specific Competencies	General-Creativity Competencies
Generating Hypotheses	Divergent Thinking
Testing Hypotheses	Association & Bisociation
Problem solving	Imagination
etc.	etc.

TAB. 1: CONCEPTUALIZATION OF SCIENTIFIC CREATIVITY

Both parts are closely linked and mutually dependent on each other. For example, divergent thinking, (i.e., finding different solutions to a problem) succeeds most effectively if one also has the corresponding domain-specific knowledge and skills. Conversely, one can only discuss processes at the particle level without a certain degree of imagination. That means that when you promote scientific creativity, you also help the young people to build and strengthen their basic knowledge at the same time.

Domain-Specific Competencies

Creative work and ideas arise from the variation and recombination of existing knowledge elements in new patterns (*Benedek & Fink, 2019*). Therefore, knowledge of subject-specific concepts and their relationships as well as adequate skills, like the ability to formulate or test hypotheses are the basic prerequisites for creativity *(Huang et al., 2017*).

General-Creativity Competencies

General-creativity competencies include various cognitive skills such as divergent thinking, association and bisociation, analogical thinking, imagination, or metacognition (*van de Kamp et al., 2015, Hadzigeorgiou et al., 2012; Hu & Adey, 2002; Kind & Kind, 2007*).

Divergent Thinking

The American psychologist Paul Guilford (1956) first introduced the term divergent thinking as a counterpart to convergent thinking. For him, divergent thinking was one of the most essential prerequisites for creative achievements, because with divergent thinking it is possible to generate many original solutions.

Convergent thinking is important and helps us to classify and to categorize our world. Convergent thinking is fact-oriented and enables us to classify statements into right or wrong. We think convergently when our brain searches for a single correct solution.

In contrast to convergent thinking, divergent thinking is characterized by cognitive processes in which a problem is analysed from different perspectives (*Kaufman et al., 2008*). In this way, not only a solution is considered. It enables us to generate a wide variety of ideas. Especially in the context of scientific creativity, divergent thinking is therefore an important indicator of the creative problem-solving potential (*Runco & Acar, 2012; Huang et al., 2017*).

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To measure the ability of divergent thinking it is common to distinguish between fluency, flexibility, and originality (*Runco, 1999*):

- Fluency - this refers to the total number of named ideas.
- Flexibility - this refers to the number of different categories to which the ideas can be assigned.
- Originality - this indicates how many of the named ideas are surprising and outside the expected range.

For creative achievements, the interplay of both ways of thinking, convergent as well as divergent, is crucial. Why is an interplay between convergent and divergent thinking so important for creative performance? The answer derives from the definition of creativity as the combination of different fields of knowledge into new patterns. For knowledge generation, convergent thinking plays a central role. Divergent thinking is necessary to link or recombine different content areas in a creative way.

Original Association and Bisociation

Original association refers to the combination of terms from a domain. In other words, the ability to recombine a wide variety of terms within a domain to form meaningful units. Bisociation is the linking of two very different and distant concepts and requires the skills of conceptual combination (*Koestler, 1964; Ward et al., 1997*). Both original associations and bisociations are elementary components of cognitive processes, and bisociation in particular is necessary as an essential factor for creative problem-solving (*Benedek et al., 2020*).

Analogical Thinking

Analogies aim at comparing different concepts and finding similarities between them. The ability to draw on a familiar analogous concept plays an important role in the learner's learning process. Analogical thinking makes it possible to transfer the structure of an unfamiliar domain to a familiar content. Only by abstracting the essential features and considering the limits of abstraction a deeper understanding of a complex concept can be achieved (Arnold & Millar, 1996). In addition, the use of analogies in the classroom increases learners' self-efficacy in learning new content as well as memorisation in recalling features of a concept. Analogies are helpful in creative problem-solving because they allow similarities between two problems to be identified and proven strategies to be applied to the new problem (*Condell et al., 2010*).

Imagination and Fantasy

In psychological research, imagination or "seeing with the mind's eye" is a term with a broad definition (*Kind & Kind, 2007*). In general, it refers to the ability to mentally detach oneself from the current time, place, and circumstances. Only then is it possible to think about what might have been, to plan for the future, and to create fictional worlds (*Taylor, 2011*). According to this definition, imagination is not only the construction of images. The concept also includes the formation of internal ideas or scenarios. For both scientists and learners, imagination is an essential prerequisite for scientific creativity and a necessary learning tool to access the world of atoms, molecules, field lines, and other scientific concepts (*Hadzigeorgiou et al., 2012; Kind & Kind, 2007*).

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Metacognition and Personality Traits

Metacognition means to be able to reflect on one's own cognitive processes and actions on a meta-level and includes both knowledge elements and specific skills (*Pacheco & Herrera, 2021*). Especially in fostering learners' creativity in the classroom, metacognition has a clear positive impact (*van de Kamp et al., 2015*). In the context of scientific creativity metacognition includes for example:

- Knowledge of what characterises divergent thinking.
- Knowledge about which thinking styles are necessary in the different problem-solving phases.
- Knowledge about what personality traits characterise creative people.
- Reflection on one's own performance in terms of fluency and flexibility of the generated ideas.
- Assessment of personal strengths and weaknesses in creative processes.

In addition to metacognition, various personality traits are also important for creative achievements, like curiosity, persistence, openness, and tolerance for failure (*Feist, 2010; Kozbelt et al., 2010; Selby et al., 2005*).

Strategy of implementation

The FLEX-BASED LEARNING Programme

Based on the concept of scientific creativity we designed the FBL programme for STEM subjects. Scientific creativity comprises several creative skills and metacognition. Therefore, the FBL programme not only includes different techniques for the individual creativity competences, but also three tools for metacognition (see Table 2).

Techniques	Emphasis on Scientific Creativity
Shorty & Flexy	Metacognition about fluency, flexibility & originality
Be a COMET!	Metacognition about own creative personality traits
Role Models	Metacognition about the own role in team processes
Thinkflex	Divergent thinking & metacognition
Flex-Experiments	Divergent thinking & metacognition
Clustering	Original association
WoSeCo	Original association
Live Act	Imagination, bisociation & metacognition
Visual Analogy Training	Analogical thinking, imagination & original association

TAB. 2: FBL TECHNIQUES AND THEIR EMPHASIS

The term *flex* stands for flexibility, one of the three important factors for divergent thinking, which is also particularly important for coping with real-world problems (*Runco, 2004*). Some of the FBL tools will be briefly described in the following sections. More information about FLEX-BASED LEARNING and the individual tools can be found in Haim & Aschauer (2022).

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Shorty & Flexy

Shorty & Flexy are two imaginary figures supporting learners to reflect and to analyse their ideas and thoughts.

In order to be able to discuss this metacognition element at learners´ level, we use the brain as a library analogy with the books representing all our knowledge and experiences. And the thinking processes are represented by two imaginary actors called *Shorty & Flexy*.

FIGURE 1: SHORTY & FLEXY FOR METACOGNITION ABOUT ONE´S THINKING STYLES

Shorty can be characterised as:

- He is convenient and promptly provides you with obvious solutions.
- He provides a routine so that you can quickly make a decision.
- His ideas are tried and tested in everyday life, but not creative.

Therefore, Shorty is incredibly important to manage our daily life. With the help of his routine, we can generate solutions without much energy effort. However, Shorty stands for small-minded thinking and does not help us to develop original ideas.

Flexy can be characterised as:

- He gives you creative ideas.
- He needs a little longer for ideation.
- He loves to consider other perspectives, using the "perspective check".

Flexy stands for original thinking, who likes to take effort to break out of the expected frame. It helps us to break out of routine, to find original ideas. We therefore need it especially for brainstorming.

In order to be able to work effectively with Flexy during brainstorming, we have developed the Perspective Check for learners (see Figure 2).

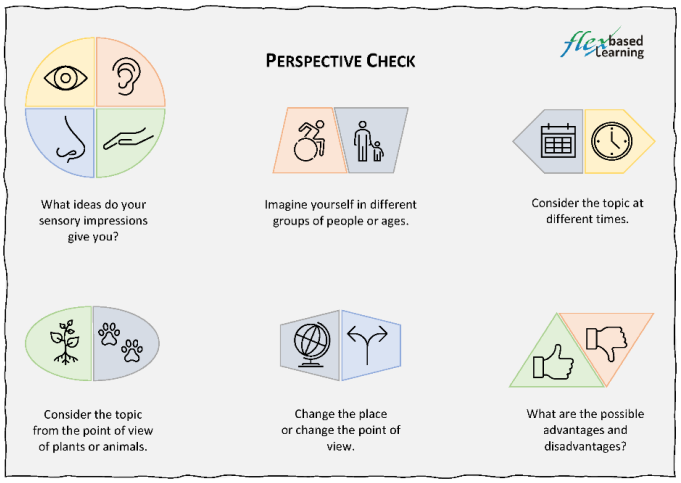

FIGURE 2: PERSPECTIVE CHECK

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The *Perspective Check* covers all the important thinking styles and guides the learners from one perspective to another, asking them:

- What ideas do your sensory impressions give you?
- Put yourself in the shoes of different people or age groups.
- Look at the topic from the point of view of plants or animals.
- Change the place or change the point of view.
- What advantages and disadvantages can arise?

Thinkflex

Thinkflex is a tool to promote divergent thinking in the classroom. The name *Thinkflex* is derived from the two words think and flexibility. Therefore, *Thinkflex* is an invitation to the pupils to think flexibly, i.e. to expand their own way of thinking in all directions. The challenge in *Thinkflex* tasks is to generate as many and as different answers as possible. For this to succeed, the task should always be viewed from a wide variety of perspectives.

All *Thinkflex* tasks are linked to the contents of the curriculum of the respective subject and cover the typical subject-specific competencies. As an example, some thinking flex types for science subjects are given in table 3:

Typ	Example
Asking questions	What questions can you think of about a candle flame?
Finding causes of errors	The table salt does not dissolve in water - Why?
Findings Possibilities	How can the humidity in the laboratory be increased?
Recognising consequences & implications	What would be the consequences of a complete phase out of fossil fuels?
Recognising advantages & disadvantages	What are the advantages and disadvantages of fireworks?
Finding Uses	What can you do with a robot that can jump 30 meters high?

TAB. 3: TYPES OF THINKFLEX

Procedure of a Thinkflex

As with several other FBL techniques, a *Thinkflex* is done according to the Listen-Think-Pair-Share cycle (Lyman, 1981). This setting offers a perfect condition for creative work, as there is a balance between individual and group work. The learners are encouraged to:

Listen – listen carefully to the task
Think – think about the task alone
Pair – discuss the individual answers in small groups
Share – share the results with the class

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In a *Thinkflex*, the Listen-Think-Pair-Share cycle is realised as follows:

1. **Task:** Learners are given a worksheet. This worksheet provides the tasks and guides the learners through the different phases of the work. After the learners have carefully read the problem statement, they should imagine the problem and possibly make a sketch of it. This step should primarily provoke learners´ imagination.
2. **Brainstorming:** Now the learners should come up with ideas regarding the task and note them on the worksheet. In order to be able to generate as many different ideas as possible, they are asked to work with the perspective check. This phase should last about 3 minutes. It is very important that learners work individually in this first brainstorming phase because this way they are not influenced or disturbed by the ideas of other learners.
3. **Exchange:** In this third phase the pupils present and discuss their ideas within the group. In addition, they also think about other possible answers within the group.
4. **Presentation & Discussion:** At the end, the learners present their group results to the whole class. The educator moderates and reflects together with the learners the flexibility and originality of the answers using Shorty & Flexy. At the end, a joint collection of ideas should be created.

Flexperiments

The term *Flexperiments* stands for **flex**ible solution-orientated ex**periments**. In *Flexperiments* an open-ended task should be solved in many different ways. The main goals are:

- Fostering divergent thinking and action
- Promotion of Learners´ fault tolerance
- Support learners´ team competences
- Increase learners´ self-efficacy in problem solving
- Breaking learners´ functional fixedness

As with *Thinkflex* the tasks of *Flexperiments* are linked to the contents of the curriculum of the respective subject. The *Flexperiments* for science subjects can be divided into different types (see Table 4):

Check hypotheses	Check sources of error
Separate substances	Synthesize substances
Implement possibilities	Identify features

TAB. 4: SOME TYPES OF FLEXPERIMENTS

The procedure of a *Flexperiment*

Flexperiments are usually carried out at the end of a subject area because learners should have the necessary content knowledge and skills. According to Listen-Think-Pair-Share cycle, the procedure of *Flexperiments* is:

1. **Task:** Learners are given a worksheet with the problem statement.
2. **Brainstorming:** First, the learners brainstorm individually and note their ideas. In this “Brainstorming – unlimited” they can assume that they have enough time and any materials they want. In a second step, the learners are informed that only certain materials are available for problem solving. Therefore, the “Brainstorming for implementation” starts, in which they individually think about ideas, considering the offered materials.

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3. **Exchange & Decision:** In small groups the learners exchange their ideas, and they decide which ideas they will implement.
4. **Implementation:** Now the learners implement their ideas and note their results or observations.
5. **Presentation & Discussion:** Finally, all groups present their solutions in the class and discuss about difficulties that encountered and suggestions for improvement. Afterwards together a collection of creative solutions is created.

Remarks on Flexperiments

For implementation the learners mainly can use everyday objects. The reason for this is that we want to promote the critical thinking style. Since many solutions are often only possible if the materials are misused by breaking the provided materials' functional fixedness (*Duncker, 1945*). This is significant because functional fixedness often hinders problem-solving (*Anderson, 2005*).

For several reasons, it is important that learners think of several different ways to solve the problem:

- The first solution is obvious and only requires convergent thinking.
- Divergent thinking is needed for more solutions.
- As the number of solutions increases, so does the originality.
- Every solution has advantages and disadvantages.
- They are prepared against failure. If a solution doesn't work, they have alternatives.

Clustering & WoSeCo

Clustering and *WoSeCo* are techniques that are used in the FBL programme to support the development of adequate content knowledge on the one hand and to promote associative thinking as well as verbal fluency on the other.

Clustering

The main goals of *Clustering* are:

- Supporting learners to structure the contents of a subject area.
- Promoting learners to correctly interpret and assign technical terms.
- Preparing learners to effectively cope other tasks like *WoSeco* or *Cluster Cocktail*.

Clustering can be used in the classroom in three different ways. To distinguish between the different forms, three distinct terms are used:

- Structured Clustering
- Stormy Clustering
- Hurricane Cluster

Structured Clustering

Learners collect all the terms of a topic and record them written in the form of a cluster.

In figure 3 an example of *Structured Clustering* is presented. In the middle is the central term, in this case "AIR". Then, starting from the middle, other terms that come to mind are noted. Each term can become the starting point for another term.

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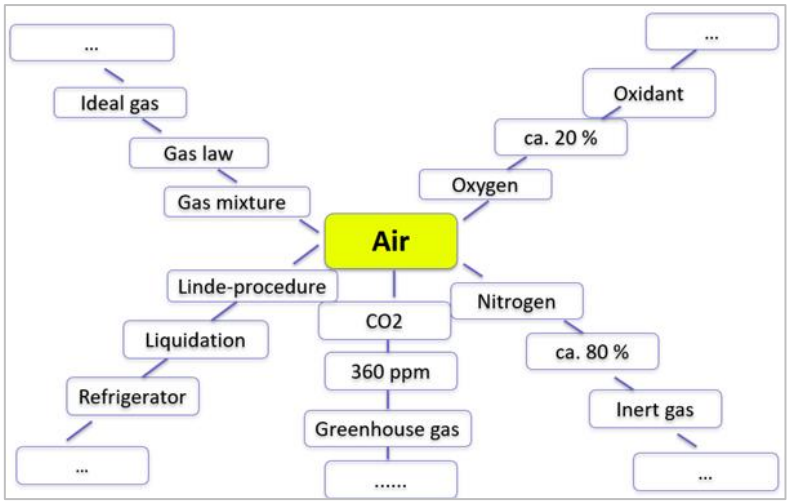

FIG. 3: EXAMPLE OF A STRUCTURED CLUSTERING

A *Structured Clustering* can be done in different social forms. The learners can do it by themselves or in groups. But it also possible that the educator creates a *Structured Clustering* together with the whole class.

Stormy Clustering

A *Stormy Clustering* is one of the verbal forms of clustering. The learners are asked to name as many words as possible in 2 minutes that come to mind intuitively for a particular topic.

1. The learners line up in pairs.
2. The educator sets the topic and limits the verbal clustering to a certain time (e.g., 2 minutes).
3. One learner of each pair now names as many terms regarding to the given topic. This should be done as fluidly as possible without pauses
4. The counterpart counts all the terms mentioned.

Hurricane Cluster

A *Hurricane Cluster* is also a verbal form of clustering and proceeds similarly to a *Stormy Clustering*. However, not only one learner of each pair names terms, but both of them name terms, like in a ping-pong play.

WoSeCo

WoSeCo is an acronym that stands for word-sentence constructions. It is a tool for training original associations, which means linking terms from different chapters or topics of a subject.

The procedure of a *WoSeCo* is:

1. Two learners sit or stand opposite each other.
2. The educator gives a starting sentence with a technical term.
3. One of the learners picks up the technical term and combines it with a new technical term to form a new correct sentence.
4. The partner now picks up the new technical term and combines it again with another technical term to form the next sentence.
5. These sentence formations are now continued alternately for as long as possible!

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In the following an example of a *WoSeCo* form chemistry is presented. It begins with the technical word "METALS". A brief explanation of the legend: The technical term to be built upon is always underlined and the added technical term is shown in bold.

- Metals are found on the left-hand side of the **periodic table.**
- The elements are ordered in the periodic table according to the **number of protons.**
- An element with the proton number 26 is **iron.**
- Iron can **oxidise** quickly.
- **Oxygen** is responsible for the oxidation.
- Etc.

The implementation in the class can be carried out in different variants. It can be done as a "single" *WoSeCo* with oneself, as a "partner" *WoSeCo* between two or more learners, and between educator and learner. Thereby, the it can be performed as a written, verbal or digital *WoSeCo*.

Set-up conditions

Normal science classes with material.

Models conclusions and recommendations

Research Results about the Effectiveness of FBL

To investigate the effectiveness of the FBL programme, we have conducted several studies since 2018 in which more than 2000 pupils participated. As a diagnostic tool the DPAS test (*Aschauer et al., 2022*) was used. DPAS stands for *Divergent Problem-Solving Ability in Science*. The term *divergent problem-solving* highlights that the focus of the test relies on the ideation phase, where different solutions should be found for a given problem.

In our intervention studies we use a two-group repeated measures design. So, the learners are tested at the beginning and the end of the school year. In the control group, no specific techniques were used to promote divergent problem solving or SC. In the intervention group, educators carried out several FBL interventions during the school year, on average about 10 interventions.

For operationalisation of creativity, we count the number of ideas for the fluency score and we count how many different categories are covered by these ideas for the flexibility score. Based on both scores the Creativity Quotient (CQ) was calculated as a composite creativity score including both, fluency and flexibility, but with more weight on flexibility (*Snyder et al., 2004*).

All our studies showed that the divergent problem-solving ability regarding to the CQ score significantly increases in the intervention group, whereas there is almost no change in the control group. As an example, the results of a study conducted in the schoolyear 2019/2020 are shown in figure 5. Detailed results of the study from 2018/2019 can be found in the publication of the validation of the DPAS test (*Aschauer et al., 2022*).

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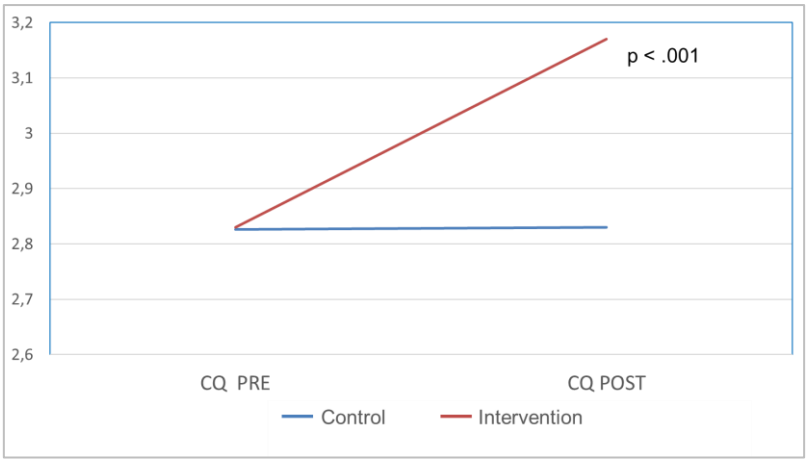

FIGURE 5: CQ SCORES AT PRE- AND POST-TEST IN THE CONTROL (N=283) AND INTERVENTION (N = 287) GROUP

The remarkable aspect is that this significant increase already occurs with an average of about 10 interventions. To implement the FBL programme successfully, it is therefore not necessary to completely change the usual way of teaching. In our experience, it is sufficient if FBL techniques are used in about 20% of the teaching time.

How do learners feel about it?

Several authors highlight the urgency of promoting scientific creativity, especially among gifted learners *(e.g., Cevher et al. 2014; Kizkapan & Nacaroğlu 2021; Kim, 2008; Stoltz et al., 2015*). Above all, one reasons should be mentioned in this context. A high IQ alone does not provide a satisfactory explanation for highly gifted performance, but the interaction between intelligence and creativity must be considered (*Cropley, 1993*). Divergent thinking, originality, creative personality traits and a stimulating environment play a central role (*Stoltz et al., 2015; Cropley, 1993*), especially for gifted underachievers (*Kim, 2008*). Regarding to divergent thinking findings of Cevher et al. (2014) are evidence for the need to foster mainly gifted learners´ originality (the ability to produce unusual or unique ideas) and elaboration (the ability to adapt abstract ideas into realistic solution).

Also, the research to explore the impact of FBL for educating gifted learners is still ongoing, for several reasons we are convinced that our programme can provide a great contribution in fostering gifted learners:

- First results of our FBL intervention studies indicate that although gifted learners had already higher CQ scores at the beginning, the FBL programme nevertheless achieved a significant increase of the CQ. Thus, a saturation effect could not be detected.
- The programme includes techniques that promote different aspects of creative thinking, strengthen creative personality traits, and consider the level of metacognition. In this way, both programmes fulfil the call for a holistic approach in the support of gifted learners (*Cropley, 1993*).
- Gifted pupils exhibit exceptional intellectual capabilities and possess a deep curiosity about the world around them. Fostering their scientific creativity and giving them the chance to solve real challenges, like in the InFOCUS programme, we empower them to explore new horizons, we enable them to tackle complex problems with confidence and ingenuity, and we empower them to become future innovators.

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How do educators feel about it?

Educators who took part in the training activity in the Netherlands implemented techniques from the FLEX-BASED LEARNING programme in their school and also attended the evaluation. Of these seven educators, two evaluated two techniques from the FLEX-BASED LEARNING programme, the others evaluated one technique each. There is therefore a total of nine responses. All the techniques used (Thinkflex, Woseco, Clustering and Flexperiment) were rated very highly. The question “How well has the implementation of the tool succeeded?“ was answered five times with “extremely well“ and four times with "somewhat well". No specific stumbling blocks were mentioned. Of course, the learners first need to be familiarised with the techniques, and it is particularly important to explain why these types of tasks are useful, how the learners should work with them and what creative thinking style they encourage. As many studies have shown, metacognition plays a central role in the promotion of creative thinking.

The feedback is consistent with the feedback from the educators during the workshops. Here too, the techniques were rated very positively, especially the well-structured worksheets and the flexibility of the techniques, so that they can be adapted to individual circumstances.

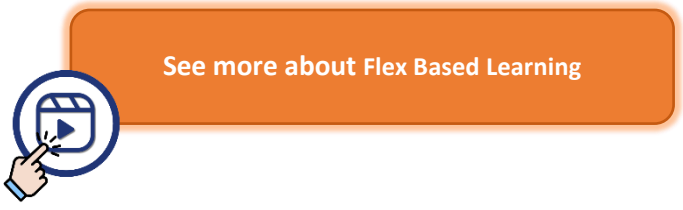
Two of the educators also took part in our FLEX-BASED LEARNING in-service *teacher training programme* and established the techniques at their schools. One of these educators also attended our INNOVATIVE FOCUS training course. There is a desire to implement both programmes in their school and to become a “School of Creative Solutions”.

Finally, some exemplary feedback:

- "Some of the teams where great in finding new, unexpected ideas"
- "Increases motivation of the learners"
- "I will continue with different kinds of interventions, like thinkflex with I have also already experienced with to stimulate the fantasy and creativity of the learners!"
- "Great method"

More information

More information about the FBL programme and the related in-service educator training courses, which are also offered for ERASMUS educators, can be found at: https://www.school-creative-solutions.at/en/



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Example

Elective Subject: Club of Creative Solutions – for Changemaker only

Introduction

The elective subject “Club of Creative Solutions” (CCS) is aimed at learners in the 9th and 12th grades and provides the opportunity to develop creative solutions for real challenges in the context of sustainability. The subject is based on the principles of the InFOCUS programme and integrates innovative methods such as design thinking, bisociation, and work on real projects. The goal is to promote learners' creative competencies and empower them to actively shape a sustainable future.

Objectives of the Elective Subject

- Promote creative thinking and problem-solving skills.
- Develop projects within the context of the Sustainable Development Goals (SDGs).
- Strengthen teamwork, project management, and communication skills.
- Link scientific work with social engagement
- Recognise and implement sustainable ideas to improve the school and local environment.

Core Tasks and Activities

1. Be the Change – Creating Awareness

   Learners actively engage with the SDGs and analyze how their own actions can bring about change. They identify challenges in their environment and develop initial solution approaches.
2. Creativity Techniques and Innovation Tools

   Various creativity techniques such as morphological analysis, stimulus word association, and design thinking are taught. These techniques serve as a foundation for developing innovative ideas. Learners learn to apply divergent thinking and develop original solutions.
3. Teamwork and Project Management

   Learners work in teams on projects and learn the basics of project management – from time planning to resource management. Emphasis is placed on responsibility and self-organisation.
4. Communication and Presentation

   The ability to communicate with external partners (e.g., companies, NGOs) is enhanced through the use of communication tools, fundraising methods, and presentation techniques. Learners learn to present their projects convincingly and successfully market them.
5. Prototyping and Practical Implementation

   A large part of the class is dedicated to developing and implementing a real project. From brainstorming to the finished prototype, learners work on sustainable solutions that can ideally be implemented directly. External partners and/or experts accompany the process.

Long-Term Vision

The Club of Creative Solutions (CCS) aims to empower learners to act as innovators and creative problem-solvers in the long term. By closely linking science, technology, and social engagement, a new awareness of their own ability to shape and take responsibility for a sustainable world is created.

Download an example of a Biology Flex-Based Learning

Download the Anastasia TLA Portfolio

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Honors Pedagogies

***Janet Jansen**, Bachelor of Education: general economy. Master Educational Leadership. Programme manager Excellence Education Alfa-college Vocational Education, Groningen, The Netherlands.*

Alfa-college is a regional training centre in the north of the Netherlands and provides vocational education, vocational training and adult education. Next to regular education Alfa-college offers Excellence programmes.

Excellence programmes are selected study programmes linked to vocational education. These are designed for motivated (and gifted) learners who want to do more than the regular programme offers. The programmes offer educational opportunities that are more challenging and demanding than the regular programmes. We believe all learners are talented, so we offer programmes for every learner, on various levels. There are programmes in sports, art and culture, personal development, durability and languages. To offer the learner the best support in these programmes we use a didactic model called 'Honors pedagogies' (Wolfensberger, 2012).

The theory

The model of honors pedagogies was first introduced (to higher education) by Marca Wolfensberger (2012), in her PhD dissertation Teaching for excellence. Honors pedagogies revealed (*Wolfensberger, 2012*).

This study discerns three key components of honors pedagogies. Educators from the United States and the Netherlands perceive the following teaching approaches as appropriate for honors education (talent education): creating community, enhancing academic competence and offering (bounded) freedom.

Wolfensperger (2012) has explored the teaching strategies related to this pedagogy and presents a different cluster of strategies for each component.

Creating community

Three clusters of teaching behaviour are related to creating community:

1. fostering social relatedness between the teacher and honors learners and among honors learners through interaction
2. creating a positive and supportive atmosphere through encouragement
3. becoming part of the community through interest and commitment

According to additional information from the interviews, educators believe that institutional support for honors is needed to be able to create an honors community.

Enhancing academic competence

Three clusters of teaching strategies are related to enhancing academic competence:

1. offering an academic and societal context and stimulating connective thinking by tackling issues from an interdisciplinary angle
2. stimulating analytical thinking and research skills by taking part in research
3. presenting a quantitative and qualitative challenge, for instance by giving challenging assignments

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In the interviews, the educators stressed the importance of fostering creative, critical and independent thinking for honors learners.

Offering (bounded) freedom

Finally, three clusters of teaching strategies are related to offering bounded freedom:

1. teaching behaviour that offers space for learners' questions, choices and initiatives, like allowing self-regulation
2. stimulating enthusiasm and experimentation by surprising the learners
3. encouraging learners to behave professionally (in learning and research), for instance through a master-apprentice relationship.

In the interviews, educators said that offering freedom is possible thanks to mutual trust and respect. Giving responsibility to learners, coaching them to reflect, and presuming that they will take ownership of their learning are strategies related to offering freedom. Educators see offering freedom as a means of fostering learners' involvement and outstanding performance. The full dissertation can be read in the publication Teaching for excellence. Honors Pedagogies revealed (*Wolfensberger, 2012*).

Download the full dissertation

Strategy of implementation

In this paragraph we will elaborate on the three key components and offer educators self-assessments for the strategies of the three components; to the extent to which educators master these strategies and to the extent the educators feel these strategies are important for their context and their role within talent education. This can give a clear inside to what strategies educators have to further develop and if some convictions are a barrier for effective talent education. Educators characteristics, which make honors education successful, are also described in this paragraph.

Creating community

In a community of learners who are eager to do more for their development, learners can maintain their enthusiasm. Additionally, a community is valuable because it gives learners the opportunity to show initiative and develop personal leadership within a group. Moreover, they learn skills by working with and for each other. Learners also form a community of like-minded individuals with their educators, where they learn together and also engage in social interactions. The community also offers a safe environment to learn and make mistakes.

For educators who want to asses themselves use this link for the Self-assessment for Educators 1 Creating community

Download Self assessment for educators 1 – Creating community

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Enhancing academic competences

To enhance academic competences educators should promote critical and creative thinking, research skills and offer challenging learning tasks. Learners experience challenges if 3 factors are combined.

These 3 factors are:

- complexity
- high expectations from educators
- autonomy

What learners consider a challenge varies from person to person. Intrinsic motivation arises when the challenge fits well with their abilities. This leads to focus and flow. Too little challenge can cause boredom, while too much challenge can make the learner anxious or frustrated. Educators should look for the learner 's zone of proximal development and assign tasks which can be done with assistance as shown in figure 1 below.

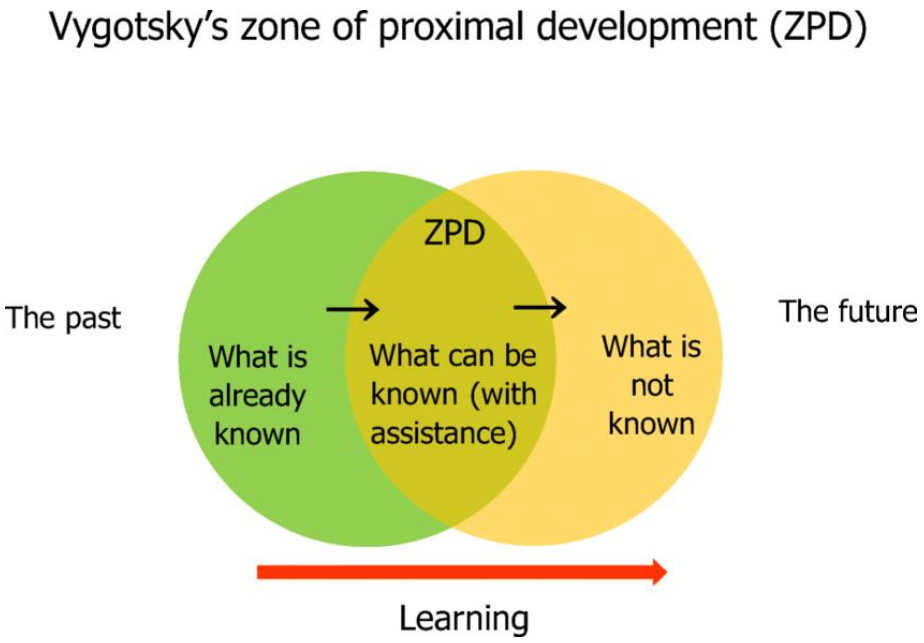

FIG. 01 VYGOTSKY ZPD

Complexity

Understanding the complexity of tasks helps educators assign appropriate challenges that match the learners abilities, promoting growth and learning without causing frustration or boredom. The complexity of a task for a learner can be described in terms of how challenging it is relative to their current skills and knowledge.

Complexity examples:

- ✓ Simple Task: these tasks require basic understanding and skills. For example, a math problem that involves simple addition and subtraction.
- ✓ Moderately Complex Task: these tasks require a combination of skills and some critical thinking. For instance, writing a short essay on a familiar topic for a learner.

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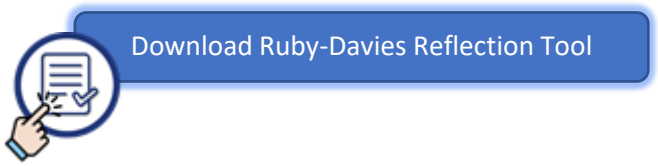
- ✓ Complex Task: these tasks demand advanced skills, critical thinking and problem-solving abilities. An example would be a learner conducting a science experiment and writing a detailed report on their findings.
- ✓ Highly Complex Task: these tasks involve multiple steps, advanced knowledge, and the ability to integrate various concepts. For example, a learner developing a research project, collecting data, and analyzing the results.

High expectations

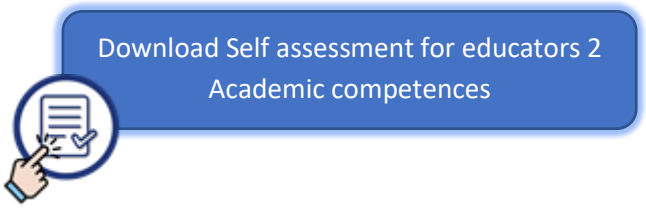
Rubie-Davies (2015) conducted a study on differences in interaction between educators and learners for whom they held high or low expectations. In a subconscious way an educator influences the academic gains of learners. High expectations educators interact in a different way with (perceived) high achievers, they give more feedback and offer more challenging tasks. Educators can also consciously show high expectations by expressing their confidence in learners when giving a challenging task. Vijfeijken (2022) developed a reflection tool for educators of their expectations of learners on interactions with learners and classroom behavior. The purpose of the reflection tool is to gain insight into the (potential) effects of educators' expectations of learners on interactions with learners and classroom behavior.



Autonomy

When educators offer learners choices in process and contents of the assignment it will enhance the challenge of the learning task. More can be read below at Offering (Bounded) Freedom.

For educators who want to assess themself use this link for the Self-assessment for Educators 2 Academic competences.



Offering (Bounded) Freedom

A valid reason to give learners freedom is when you offer choices which are meaningful for the learners, it connects to the learners own motivation. Learners can be given opportunities to choose group members, themes, assignment, materials and the way competences are demonstrated. Although bounded freedom increases motivation it is still important to give a degree of structure and feedback to learners to keep them on track and not to feel lost. In order to learn and grow, learners have to believe they are able. This requires a growth mindset instead of a fixed mindset . In the film below Carol Dweck (Stanford, n.d) explains the principles of this theory. A lesson plan , Growth and Fixed mindset, is offered here to stimulate a growth mindset for learners (link). For educators who want to assess themself use this link for the Self-assessment for Educators 3 Bounded freedom.

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Developing a Growth Mindset with Carol Dweck

Download Lesson plan Growth and Fixed mindset

Download Self assessment for educators 3 Bounded freedom

Educators characteristics

Educators behavior is of big influence on successfully implementing Honors Pedagogies.

Wolfensberger (2012) describes the following characteristics which make honors educators effective as a coach and role model:

1. Authentic teaching: being an example of a person with a learning attitude, who dares to accept a challenge and is comfortable with the idea not to have all the answers.
2. The courage to teach: dares to offer difficult and interesting assignments and dares to give learners freedom and responsibility.
3. Being able to (offer) challenge: developing assignments that are really challenging with depth and creativity, challenging learners beyond their comfort zone.
4. Investing in relationships: prepared to discuss with learners their own questions, ambitions, success and failure.
5. Always searching for the best teaching strategies and learning moments: evaluating own teaching strategies, starting with learning goals of learners; what is meaningful for them. Evaluating how much freedom a learner is able to handle.

Being an example of continuous learning: educators are also prepared to go beyond their own comfort zone, to take risks and to accept a challenge.

To assess yourself in the extent to which you, as an educator within talent education, are a motivated and reflective professional use the following form: Self-assessment for educators 4, the professional educator.

Download Self assessment for educators 4 The professional educators

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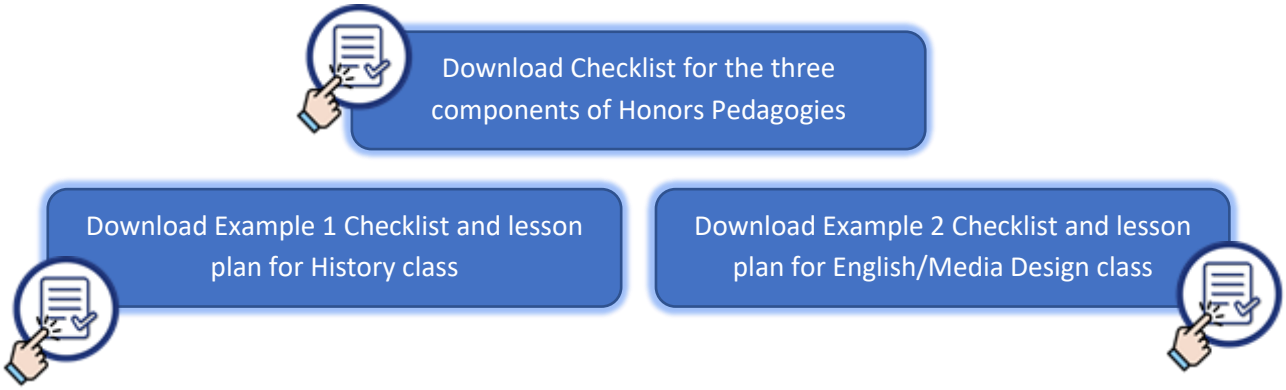
Set up conditions

In this paragraph, the set-up conditions are discussed, practical conditions for implementing Honors Pedagogies in projects and lessons. These are clarified using a checklist connected with two lesson examples. The checklist provides some ideas for implementing the 3 components.

To use Honors Pedagogies effectively the three components should be applied in a lesson or project. But as an inexperienced educator (with this model) it is possible of course to start with one or two of the components and expand over time to the three components. Although we approach the components in the checklist separately, there is overlap between them. For instance, autonomy/freedom is part of both the component Enhancing Academic Competence and Offering (Bounded) Freedom. Creating Community is also connected to the other components; by stimulating Academic Competence and Offering (Bounded) Freedom, Creating Community may also receive a positive boost.

In this link a checklist for the three components of Honors Pedagogies is provided. Educators make choices in what they want to apply in their own lessons. This checklist with choices are added to two lesson examples; a history lesson and a English/Media design lesson.



Models conclusions and recommendations

The model Honors Pedagogies was tested in classes with learners in the age range from 10 until 19 years old, in general as well as in vocational education. The subjects in which the model was used vary from mathematics, English, chemistry and history. The results from testing do not suggest that the model is more suitable for a certain subject, age or education, it is applicable for all the areas. The large majority of the educators stated that this model helps them to support (talented) learners to reach their full potential.

The component Offering (Bounded) Freedom from the model is most applied in the lessons. Educators provided choices in themes, process and final product. Creating Community often took shape by offering choices in the way learners work together. Educators experienced the most difficulty in applying Enhancing Academic Competence in their lessons.

Although an example of Honors Pedagogies applied in a History lesson was provided, some teachers suggested that more information to implement Honors Pedagogies in the lessons would be supportive. We underlined this wish and now provided a checklist and two examples for implementing Honors Pedagogies in lessons in this eHandbook.

How do the learners feel about it?

The learners much appreciated the freedom they were given, to have the opportunity to choose in different areas , this was motivating and fun for them. They were happy that the requirements weren't too strict and that they could be creative. They highly valued the chance to have a partner to discuss content with

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and also the chance to get help from the educators if needed. A few learners were a little annoyed, they preferred to be told exactly what to do. Learners also said it was sometimes strenuous as they (had to) put more effort into the product.

Educators experienced that the model worked for the gifted learners. It was motivating for them and they were proud to choose their own research method and to take responsibility for their work, it made a lot of sense to the learners. They were committed and responsible. In most cases the overall engagement was high. The following quotes demonstrate the enthusiasm of the learners: ” this form of working makes you more concentrated, more focused than in a normal lesson”. “We will never forget this year and we did things we may never do again in our lives!”

How do educators feel about it?

Overall the educators had good experiences with the model. According to one educator; “for the educator it adds a new dimension to teaching, also a bit out of the comfort zone for the educator. Sometimes it’s just easier to make all the choices yourself but with this model this is quite different”. To work with a new didactic model requires more work and energy at first but this outweighs the results. Another educator said she felt more able to anticipate the difficulties encountered. Her view on evaluation also changed, she no longer questioned the learners in relation to the framework but asked the learners to prepare a portfolio in which to demonstrate how the assignment helped them to develop skills they had chosen from the framework. This offered a kind of metacognition, the learners knew what they progressed in and what they still needed to work on in the future. Another educator describes his experience with the model as; “it was motivating, creative and engaging for me. This model has a positive impact on my learning process and helped leaners to understand the material more easily”. Another educator said; “it adds a new dimension to teaching, also a bit out of the comfort zone for the educator. Sometimes it’s just easier to make all the choices yourself, but with this model this is quite different”.

See more about Honors Pedagogies

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Innovative Problem Solving

INNOVATIVE FOCUS

A Programme to Foster Innovative Problem-Solving in Schools

DI Dr. ***Wolfgang Aschauer****, physical didactic department, PH Upper Austria*
Prof. ***Dr. Kurt Haim****, chemical didactic department, PH Upper Austria*

The theory

As we navigate the complexities of the 21st century, global challenges such as climate change and environmental degradation necessitate transformative changes in our lifestyles and mindsets. The educational system plays a pivotal role in moulding future generations equipped with the necessary skills and values to promote sustainable, inclusive growth and a peaceful community. Education for Sustainable Development (ESD) is recognised as a critical pathway that equips learners to address these complex sustainability issues through innovative thinking and problem-solving (*Rieckmann et al., 2017*).

For ESD development to succeed, the following 8 key competencies are considered a necessary prerequisite. (*Wiek et al.; 2011; de Haan, 2010; Rieckmann, 2012*):

- **Systems Thinking**: Recognising and understanding the interconnectedness within systems to analyse complex problems.
- **Anticipatory Skills**: Envisioning future scenarios and assessing the potential consequences of actions.
- **Normative Skills:** Reflecting on and negotiating personal and societal values in the face of conflicting interests.
- **Strategic Skills**: Developing and implementing innovative, localised strategies that enhance sustainability.
- **Collaboration Skills**: Engaging empathetically with others, understanding diverse perspectives, and managing conflicts effectively.
- **Critical Thinking**: Questioning norms and practices critically and reflecting on one's values and actions in sustainability discourse.
- **Self-awareness:** Understanding one's role within the community and society at large, continuously evaluating one's actions.
- **Integrated Problem-solving:** Applying varied approaches to complex sustainability challenges to devise effective solutions.

These eight competencies are promoted through interactive, experiential, learner-centred, and action-oriented pedagogies, which emphasise collaborative and real-world problem-solving activities (*Glavič, 2020*). Furthermore, transformative teaching significantly contributes to effective ESD by fundamentally altering how individuals perceive themselves and their interactions with the world (*Slavich & Zimbardo, 2012*).

Addressing future challenges necessitates a skill set that includes not only cognitive abilities but also interpersonal and intrapersonal skills, encapsulated as the four Cs: critical thinking, creative thinking, collaboration, and communication. The promotion of creative behaviour, as a crucial form of human capital, is more important than ever. Creative performance depends on multiple factors including cognition (like

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mental flexibility and associative thinking), personality traits (such as risk-taking and tolerance for ambiguity), emotional intelligence, and environmental factors (*Runco & Acar, 2012; Sternberg & Lubart, 1995*).

Particularly, divergent thinking—a key aspect of creative cognition—is vital for generating varied solutions to open-ended problems. This form of thinking is characterised by fluency (the generation of numerous ideas), flexibility (the variety of ideas), and originality (the uniqueness of ideas) (*Guilford, 1967; Runco & Acar, 2012).*

The Innovative FOCUS programme, shortly InFOCUS programme, is a strategic initiative to incorporate these essential skills and competencies into the educational framework. Through a comprehensive, two-stage programme involving in-service educator training and direct learner engagement in real-world sustainability projects, the initiative aims to transform educational practices to align with global sustainability goals.

This article introduces the concept and one technique of the InFOCUS programme, which aims to foster creativity, innovation and practical problem-solving skills in the context of sustainability education to prepare learners to be proactive and creative agents of change.

The Innovative FOCUS Programme

Goals

Education for sustainable development (ESD) necessitates a transformative approach, emphasising key competencies that prepare learners to navigate and address complex global challenges. The InFOCUS programme, developed by the authors, aims to foster such transformative education, equipping learners with essential problem-solving and innovative thinking skills (*Haim & Aschauer, 2024*).

The primary goals of the InFOCUS programme include:

1. **Raising Awareness:** The programme seeks to instil an understanding that prosperity, peace, and environmental integrity are deeply interconnected. It emphasises the importance of sustainable development as the foundation for our thinking and actions.
2. **Promoting Divergent Thinking:** InFOCUS aims to teach learners divergent thinking strategies, enabling them to challenge conventional approaches and generate innovative solutions to real-world problems. This includes abandoning traditional ways of thinking to address sustainability challenges creatively.
3. **Developing Anticipatory Skills:** The programme focuses on enhancing learners' abilities to foresee and evaluate potential future scenarios. This anticipatory skill is crucial for designing desirable and sustainable futures.
4. **Strengthening Metacognitive Skills:** Learners are encouraged to develop self-awareness and reflection skills, enabling them to adapt their thinking and actions to implement innovative solutions effectively. This metacognitive aspect helps learners understand their cognitive processes and improve their problem-solving strategies.
5. **Enhancing Cooperation Skills:** The programme fosters learners' abilities to work collaboratively, manage conflicts, and respond empathetically within a team setting. This cooperation is vital for tackling sustainability issues that require collective effort and diverse perspectives.

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6. **Encouraging Creative Personality:** InFOCUS encourages learners to recognise and develop their creative personalities, boosting their confidence and self-efficacy. By nurturing creativity, the programme helps learners become more innovative and resilient.
7. **Building Strategic and Entrepreneurial Skills:** The programme includes training in strategic planning and entrepreneurial skills, enabling learners to launch projects that promote sustainability locally and globally. This aspect prepares learners to take practical actions and turn their innovative ideas into reality.

To achieve these objectives, the InFOCUS programme is structured in two stages. The first stage introduces learners to the Sustainable Development Goals (SDGs) and divergent thinking strategies. Through specially developed cognitive tasks and creativity techniques, learners learn to generate unconventional ideas by shifting perspectives (*Haim and Aschauer, 2022*). Reflection tools are also employed to help learners acquire metacognitive skills and improve their team competence.

In the second stage, learners apply the knowledge and skills acquired in the first stage to tackle real-world SDG challenges. This stage involves a complete creative process, from problem identification and brainstorming to prototype development and implementation (*Haim and Aschauer, 2024*). By working on practical projects, learners not only deepen their understanding of sustainability issues but also develop concrete strategies for addressing them.

The InFOCUS programme aims to transform learners' thinking and actions towards sustainable development by promoting key skills such as divergent thinking, metacognition, cooperation, and strategic planning. Through a combination of theoretical knowledge and practical application, the programme prepares learners to become innovative problem solvers and active contributors to a sustainable future.

Contents of the InFOCUS Programme

The InFOCUS programme is structured around five core domains: flexibility (F), originality (O), creative personality (C), unconscious mind (U), and strategies (S). These domains form the acronym FOCUS and collectively aim to foster essential skills for sustainable development by promoting creative and innovative thinking and acting.

A key aspect of the InFOCUS programme is the variety of tools available. The programme is holistic, with tools for every phase of the innovative process. They are used individually—for instance, promoting divergent thinking (cognitive), metacognition of creative traits (emotional), team competence (social), and specific creativity techniques (strategic). With the help of this programme, learners therefore learn step-by-step how to use creative thinking skills and problem-solving strategies to tackle and solve real-life challenges.

The five domains are described in more detail below and exemplary techniques are briefly presented.

Flexibility

Flexibility in thinking is crucial for problem-solving in real-world contexts, allowing individuals to approach problems from multiple perspectives. In order to specifically promote flexible thinking, cognitive tools from the SCIP (Scientific Creativity in Practice) programme are used. This programme was also developed by the authors and a team from the University of Education Upper Austria and was formerly called the Flex-

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Based Learning programme (Haim & Aschauer, 2022). One such tool, Thinkflex, involves tasks designed to promote divergent thinking by encouraging learners to shift their perspectives and think across different categories. These tasks are used both in preparation phases and while working on specific challenges, fostering mental flexibility essential for innovative problem-solving.

Originality

Originality refers to the ability to generate unique and novel ideas which is essential for innovation (*Zwicky, 1969*). The programme includes creativity techniques like morphological analysis, reverse brainstorming (*Evans, 2012*) and APIFOS (developed by the authors) to foster this skill. Morphological analysis, for instance, breaks down problems into fundamental parameters and explores all possible variations, encouraging learners to think beyond conventional solutions (*Allen, 1962*). The APIFOS tool developed by the authors is an acronym that stands for the following three processes: **A**nalyse **P**roduct - **I**dentify **F**aults - **O**ffer **S**olutions. This tool makes it possible to improve existing products or services. The APIFOS tool can be used to uncover weaknesses that are easily overlooked. First, the product is examined carefully, analytically, and objectively. The second step is to look for obvious problems and hidden weaknesses. In the final step, specific weak points are selected and original solutions are sought.

Creative Personality

The ability to work creatively is largely determined by personality such as self-awareness competency and cooperation competence (*Kozbelt, 2010*). Both represent important key competencies for sustainability (*Rieckmann, 2012*). Therefore, the developing of a creative personality includes the promotion of qualities such as self-awareness, openness to new experiences, and resilience. The InFOCUS programme employs reflection tools like "BE A COMET" and "Mission: Possible" to enhance these traits. "BE A COMET" helps learners reflect on their creative behaviors (*Haim & Aschauer, 2022*), while "Mission: Possible" uses a card set to guide learners through the creative process from brainstorming to project execution (*Haim & Aschauer, 2024*). These tools support learners in recognising and strengthening their creative abilities, thereby boosting their self-efficacy and confidence.

Unconscious Mind

The unconscious mind significantly contributes to creativity by enabling spontaneous idea generation and emotional processing. To tap into this resource, the InFOCUS programme includes embodiment tools such as asynchronous exercises, juggling, meditation, and Qigong. These activities help learners enhance their creative performance by improving cognitive processes like attention, working memory, and emotion regulation. Studies have shown that mindfulness and physical activities can positively influence creativity by fostering better cognitive control and flexibility (*Henriksen et al., 2020, Beaty et al., 2016; Beaty et al. 2018*).

Strategies

Real problems cannot be tackled without suitable strategies and project management. Strategic skills are essential for planning and implementing innovative projects. The programme incorporates recognised strategies from innovation management, including design thinking and dragon dreaming. Design thinking, for example, is an iterative process that involves empathising with users, defining problems, ideating solutions, prototyping, and testing. This method promotes critical and creative thinking, leadership, cooperation, and project management skills. By practising these strategies, learners learn to navigate complex challenges effectively and bring their innovative ideas to fruition (*Brown, 2009; Knoll, 2013*).

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Strategy of implementation

The Implementation of the InFOCUS programme in Schools

The above techniques are used specifically in the programme to solve a specific task. This challenge, which is an integral part of the Innovative FOCUS programme, guides learners through a multi-step process to creatively tackle these challenges. First, learners either identify a problem themselves or choose one from a predetermined list that aligns with the Sustainable Development Goals (SDGs). The focus is on topics that promise original solutions and can be implemented in their educational context.

Once a problem is identified, learners move to brainstorm innovative solutions, using a variety of creativity-enhancing techniques taught during the InFOCUS educator training. These sessions are supported by their educators, who act as facilitators throughout the creative process. Following ideation, learners design and develop conceptual prototypes, typically through a design-thinking approach that emphasises user-centric problem-solving.

The culmination of the challenge is a series of presentations where learners pitch their prototypes and proposed solutions. This phase not only showcases their creative output but also enhances their communication and project management skills. Some schools may extend the challenge to realize a prototype, turning conceptual designs into tangible outcomes.

This structured challenge is more than just an academic exercise; it is a critical component of the InFOCUS programme's goal to foster effective problem solvers equipped to tackle sustainability challenges through innovative thinking and creativity.

To enable educators to become familiar with the techniques of the InFOCUS programme and thus lead their teams through an innovative process, the authors have developed a one-year training programme for educators. The InFOCUS educator training programme is a multi-stage educational project designed to enable educators to effectively implement the InFOCUS curriculum. The programme begins with a three-day kick-off event where educators are introduced to the methods and core concepts of the programme through workshops and presentations. In the following months, they apply the newly learned techniques through practical problem-solving tasks at their schools, gaining first-hand experience of creative teaching strategies. The programme then moves into a second semester where educators come together for another three-day session to improve their skills in project management and organizing professional pitches. In this phase, the practical focus is intensified as educators guide learners in selecting and solving current challenges related to the Sustainable Development Goals (SDGs), culminating in the development and presentation of a project prototype. Throughout the programme, educators are supported by regular online sessions that provide a platform for reflection and discussion on their experiences and challenges using InFOCUS techniques. This ongoing engagement is designed to refine their teaching methods and improve their effectiveness in promoting innovative and critical thinking among learners.

In 2020, the authors developed a label for schools that are willing to embed innovative problem-solving in their school profile and thereby establish think tanks and maker spaces for learners. The "School of Creative Solutions" label is awarded to schools whose educators use the SCIP programme (previously known as Flex-Based Learning) and the InFOCUS programme in their lessons, showing learners a way to solve the challenges

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of the future with optimism, know-how and self-confidence. This label also makes the special orientation of a school visible to the outside world, enabling us to network these schools both nationally and internationally.

Set up conditions

Normal (science) classes with material.

Models conclusions

Research Results about the Effectiveness of the InFOCUS programme

Materials and Methods

As the InFOCUS programme was offered to educators for the first time in 2020, only some results of a pilot study can be presented (*Haim & Aschauer, 2024*). This study utilized a mixed-methods evaluation approach to assess the effectiveness of the InFOCUS programme at both learner and educator levels. The evaluation was structured around a set of four main research questions, aiming to determine how well the programme enhanced creativity, problem-solving capabilities, and engagement with the Sustainable Development Goals (SDGs). Participants included a total of 270 learners and 20 educators from various secondary schools who were actively engaged in the InFOCUS training during the 2021/2022 academic year. To evaluate the feasibility and effectiveness of the individual InFOCUS tools in the classroom, continuous reflection meetings were held with the educators. Data collection was conducted via online surveys, educator logs, and direct observation of classroom dynamics and learner project work. Educators and learners were asked to rate the utility of the tools and methods provided by the InFOCUS programme and to reflect on the programme's impact on their teaching and learning experiences. To assess the learners' motivation to participate in the project, the Intrinsic Motivation Inventory (*McAuley et al., 1987*) questionnaire was used at the end of the project work. The overall effectiveness of InFOCUS was assessed by determining how many teams succeeded in generating ideas for the respective problem and realising them in the form of a prototype.

How do learners feel about it?

The study highlighted significant achievements in learner engagement and project completion. Out of 270 learners who participated, a vast majority successfully developed and presented prototypes that addressed real-world sustainability challenges. These projects reflected a wide range of innovative solutions to environmental and social issues, underscoring the programme's effectiveness in fostering creativity and problem-solving skills. Learners demonstrated improved competencies in designing and implementing projects that were both practical and impactful, aligning closely with the Sustainable Development Goals (SDGs).

Feedback from learners was overwhelmingly positive. They reported enhanced motivation and a deeper understanding of sustainability issues. The hands-on nature of the projects allowed learners to apply theoretical knowledge in practical settings, which not only increased their problem-solving skills but also their personal commitment to addressing global challenges. Many learners expressed a heightened sense of empowerment and confidence in their ability to make a difference, which is a key indicator of the programme's success in fostering proactive and responsible future citizens.

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The educators reported a high level of interest and motivation among the pupils during the reflection meetings. This is also shown by the results of the IMI questionnaire. Here, the learners were asked to indicate on a 5-part Likert scale whether certain statements "not at all true" (1) to "very true" (5) to them. All subscales used show high mean values for the sum scores. For example, for the interest/enjoyment subscale, which captures intrinsic motivation per se, the agreement for "I really enjoyed doing this project activity" reached a mean of 4.4 (SD = 0.56). In the case of the perceived competence subscale, which is assumed to be positive predictors of both self-assessment and behavioral measures of intrinsic motivation, approval for "I am satisfied with my performance on this project", for example, reached a mean of 4.02 (SD = 0.74). In the case of effort/importance, the statement "I put a lot of effort into working on this project" was given a mean value of 4.02 (SD = 0.76). Regarding the overall effectiveness of the InFOCUS programme, the result is also very positive as 97 % of the learner teams were able to develop a prototype.

How do educators feel about it?

The first results of these pilot studies are very promising. During the reflection meetings, all educators reported that the InFOCUS tools proved to be very efficient. This is also confirmed by the results of the survey, where educators rated the effectiveness of each InFOCUS tool on a 5-point Likert scale (from 1 "very low" to 5 "very high"). All implemented techniques were rated on average as high (mean = 3.98 and SD = 0.92).

Educators who participated in the InFOCUS training programme reported significant professional development benefits. The training enhanced their instructional skills, particularly in integrating ESD (Education for Sustainable Development) into their teaching practices more effectively. Educators noted an increase in their ability to facilitate project-based learning, which is critical for engaging learners in complex problem-solving tasks.

The training sessions were highly valued by educators for providing them with the tools and strategies necessary to guide learners through the creative process of developing sustainable solutions. Educators appreciated the structured yet flexible approach of the programme, which allowed them to tailor the projects to fit their specific classroom contexts and learner needs. This adaptability was crucial in ensuring the relevance and effectiveness of the projects across different educational settings.

Conclusion

The InFOCUS programme has demonstrated considerable success in achieving its goals of enhancing creativity, problem-solving skills, and sustainability awareness among learners, while also empowering educators with innovative educational tools and methods. The integration of ESD into the curriculum has proven effective, with learner projects directly contributing to the SDGs and fostering a sense of global responsibility.

These results provide a compelling case for the continued expansion and adaptation of the InFOCUS programme. By further refining its methodologies and extending its reach, the programme can continue to play a vital role in preparing learners and educators to tackle the complex challenges of the 21st century.

Even though we are yet to launch the impact of the InFOCUS programme on gifted learners, we are convinced that our programme can make a major contribution to the promotion of gifted learners. Several

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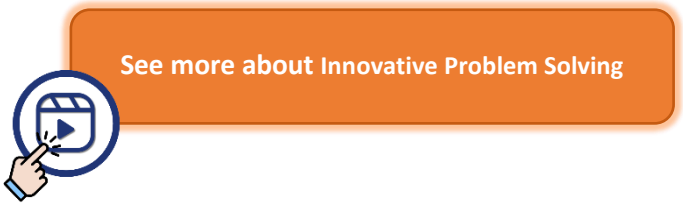
authors emphasise the urgency of fostering scientific creativity, especially in gifted learners *(e.g. Cevher et al. 2014; Stoltz et al., 2015*). A high IQ alone does not provide a satisfactory explanation for gifted achievement, but the interaction between intelligence and creativity must be considered (*Cropley, 1993*). Divergent thinking, originality, creative personality traits and a stimulating environment play a central role (Stoltz et al., 2015), especially in gifted underachievers (Kim, 2008). Concerning divergent thinking, the findings of Cevher et al. (2014) show that the originality of gifted learners and the ability to turn abstract ideas into realistic solutions (elaboration) must be encouraged. By encouraging their scientific creativity and giving them the opportunity to solve real-world challenges as part of the InFOCUS programme, we enable them to tackle complex problems with confidence and ingenuity, empowering them to become future innovators.

More information about the InFOCUS programme and the related in-service educator training course, which is also offered for ERASMUS educators, can be found at:

https://www.school-creative-solutions.at/en/



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Kangaroo Methodology

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The theory

Every child possesses unique abilities and talents, however, some exhibit exceptional capabilities and potential that surpass typical expectations for their age or grade level. These talented learners necessitate specialized support and education to fully realize their potential.

Understanding the distinction between general groups of learners and those requiring specialized attention is crucial. While all learners can achieve greatness, talented individuals often need tailored instruction, curriculum adaptations, and specialized programmes to nurture their innate talents and skills.

Teaching strategies for these learners should align with their unique strengths, interests, and learning preferences, fostering an environment that promotes critical thinking, creativity, and problem-solving. By providing opportunities for passion-driven exploration, advanced thinking, and interaction with peers of similar abilities, educators can significantly enhance the learning experience for talented learners. Implementing effective educational strategies for talented learners is not just beneficial for the individuals, it enhances the overall quality of the educational system. Offering suitable challenges and support helps in unlocking the full potential of these learners, preparing them for future endeavors.

Conversely, a lack of recognition and support for their needs can lead to disengagement, underperformance, and a consequent loss of potential, adversely affecting both the individuals and society at large.

This chapter introduces the "Kangaroo methodology", a comprehensive approach designed to aid educators in selecting and applying the most effective strategies for cultivating the talents and abilities of talented learners within the educational system. By adhering to this methodology, we can ensure that these exceptional individuals not only reach their maximum potential but also contribute positively to the world.

Talented learners, who are they?

Talented learners are learners with exceptional skills or abilities in specific areas beyond their peers.

Talented learners can be classified into two groups: learners who demonstrate a natural aptitude or ability in a particular area or domain (*Neihart, 2021; Gagné, 2018*), and learners who possess an exceptional level of natural ability in one or more areas (*Gross, 2021; Oliveira, 2016*).

What is "Kangaroo Methodology"?

The "Kangaroo Methodology" is a three-step educational approach focused on identifying, assessing, and developing the abilities of talented learners through tailored strategies.

This methodology focuses on enhancing learners' evident abilities and nurturing their potential to manifest further (*Subotnik, Olszewski-Kubilius, & Worrell, 2011*). By recognising and supporting each learner's unique talents and strengths, the aim is to guide them towards realising their utmost capabilities and contributing positively to society.

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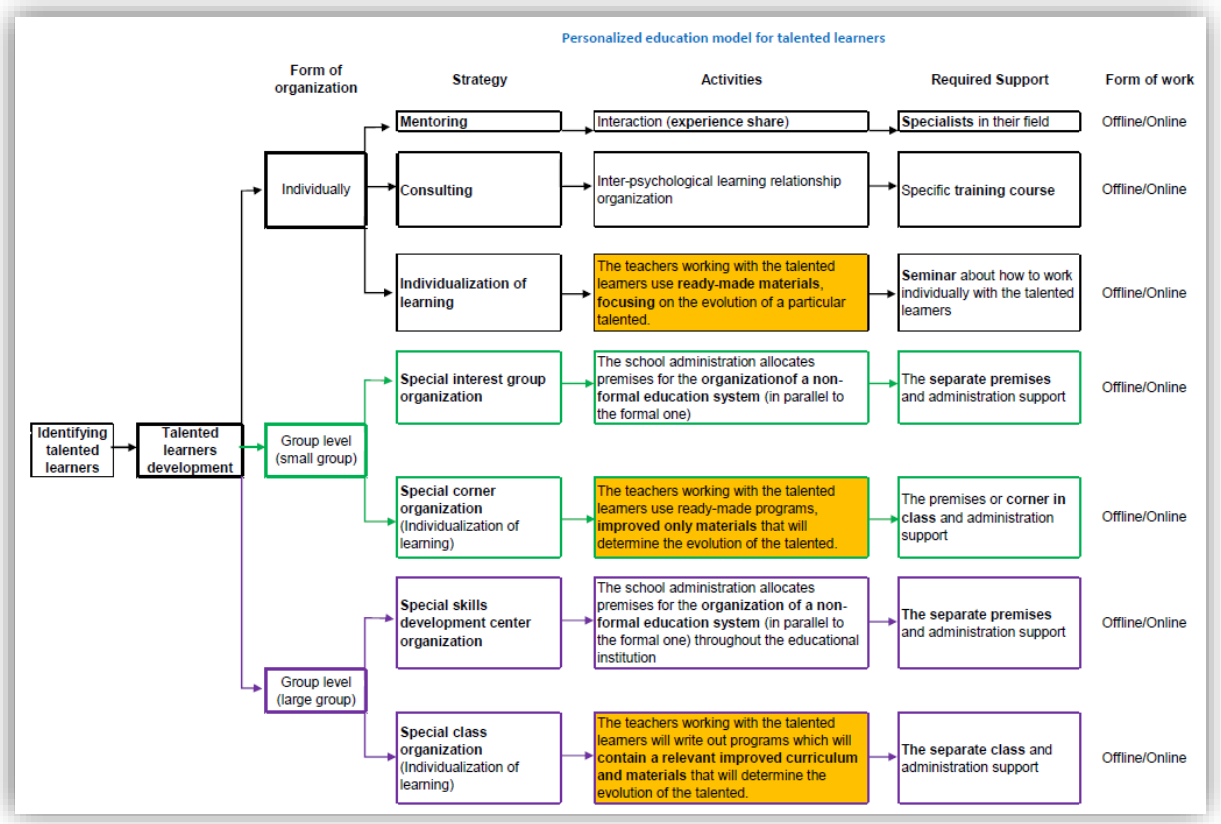
The approaches are informed by the distinctive characteristics and needs of talented learners, who possess a unique blend of talents and aptitudes requiring dedicated educational approaches (*Cross, Cross, & McCoach, 2020*). Therefore, the strategies emphasise key areas essential for their development. Consequently, a detailed compilation of strategies is provided (refer to "Personalised education model for talented learners"), tailored to meet the distinct needs of these exceptional learners, thereby equipping them with the requisite support and opportunities for success.



Understanding Kangaroo Methodology

Kangaroo Methodology in promoting social inclusion

INDIVIDUAL LEVEL

First strategy "Mentoring" (*Olszewski-Kubilius, Subotnik, & Worrell, 2015*)

- **Action:** involve specialists from different professional fields, learners or parents to become mentors for talented learner
- **Purpose:** interaction (experience share)
- **Functions:**
  - ✓ perform the functions of a supervisor, leading the learner to a high professional level in working on personal extraordinary abilities and directions chosen by the learner himself;
  - ✓ providing the communication necessary for a talented learner.
- **Mentor's tasks:**
  - ✓ Develop extraordinary abilities that will help the learner in a particular profession or professional direction.

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- ✓ Create tasks that are designed to help the learner develop specific skills related to their chosen profession or professional direction.
- ✓ Provide feedback to the learner on their progress and offer guidance on how to improve their skills and abilities.
- ✓ Help the learner set goals and create a plan for achieving those goals.
- ✓ Encourage the learner to reflect on their experiences and use those reflections to make further progress in their development.

➢ **Implementation process**

Offline Implementation	Online Implementation
Identify talented learners: utilize assessments to pinpoint learners with extraordinary abilities.	**Identify mentors**: find professionals and experienced individuals willing to mentor learners online.
Match learners with mentors: pair learners with mentors based on shared interests, skills, and developmental goals.	**Establish communication**: leverage digital platforms like video conferencing and emails for mentor-learner interactions.
Define goals and expectations: set clear objectives for the mentoring relationship, including focus areas and meeting schedules.	**Assign online tasks**: provide learners with digital tasks that align with their developmental goals and interests.
Monitor and support: ensure ongoing support for the mentoring pairs, offering resources and addressing any challenges.	**Track progress online**: utilize digital tools to monitor learners' advancements and facilitate mentor feedback.
Evaluate programme effectiveness: regularly assess the mentoring programme's impact on learners' growth and adjust as necessary.	

Second strategy "Consulting"

- ➢ **Action:** to involve specialists - psychologists and social workers in work with the talented learners (*Stephens, 2020*)
- ➢ **Purpose:** inter-psychological learning relationship organisation
- ➢ **Functions:**
  - ✓ coordination of the individual work of all those who are interested in the development of a talented learner;
  - ✓ communication with the parents of the talented learner;
  - ✓ organisation of psychological support.
- ➢ **Specialist's tasks:**
  - ✓ Providing informational and educational materials for parents to help them understand the unique needs and challenges of talented learner.
  - ✓ Organizing workshops or seminars for parents to learn effective strategies for supporting the emotional and social well-being of their talented learner.
  - ✓ Collaborating with the school staff and teachers to develop a coordinated approach for meeting the needs of talented learners.
  - ✓ Providing counselling and psychological support to talented learners to help them cope with the pressures and expectations that come with their unique abilities.

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- ✓ Developing individualized plans for each talented learner to support their personal growth and development, in collaboration with parents and teachers.
- ✓ Providing ongoing communication and feedback to parents about their learner's progress and any challenges or concerns that arise during the development of their extraordinary abilities.
- ✓ In addition to educating parents and providing emotional support at all stages of development, another important task of the specialists would be to provide counselling to the learners themselves when they face psychological problems. This could involve helping them to understand and cope with stress, anxiety, or other emotional challenges that may arise as they navigate their unique abilities and experiences. The psychologists and social workers could provide individual counselling sessions, group support, or other forms of therapeutic interventions as needed to help the pupils maintain their emotional well-being and continue to develop their talents in a healthy and sustainable way.

➢ **Implementation process**

Offline Implementation	Online Implementation
Identify specialists: assemble a team of experienced psychologists and social workers.	**Online platform creation:** develop a platform for collaboration and communication among specialists, learners, and parents.
Coordinate efforts: ensure all specialists work cohesively towards unified support goals.	**Identify online specialists:** recruit qualified specialists who can offer guidance via the online platform.
Parental communication: establish regular channels for updating parents on their child's development.	**Work coordination:** use the platform to ensure consistent support and goal alignment among specialists.
Provide support: offer comprehensive psychological assistance to learners.	**Online support:** deliver psychological support and counselling through digital means.
Adopt an individualized approach: tailor support to each learner's unique needs.	**Individualized online approach:** personalize support for each learner via the platform, considering their specific needs.
Monitor progress: continuously assess the development of talented learners and adjust strategies as needed.	**Progress monitoring:** use digital tools to track learners' progress and adjust support plans accordingly.
Evaluate programme effectiveness: regularly assess the consulting programme's impact and make necessary adjustments.	**Platform evaluation:** periodically review the online platform's effectiveness, gathering feedback for improvements.

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Third strategy "Individualization of learning" *(Wu et al., 2018)*

- **Action number one:** to **involve a teacher** who deeply knows and loves his subject, as well as trained to work with talented learner, to work with the talented learners
- **Action number two:** to **integrate the opportunity** to study a particular subject with older learners into the programme of a particular learner
- **Purpose:** using flexible and individualized tasks, to develop the extraordinary abilities of the talented learner
- **Functions:**
  - ✓ assessment of the learner's extraordinary abilities;
  - ✓ improvement of ready-made educational materials, focusing on the development of a particular talented learner;
  - ✓ creating an emotionally safe environment so that the talented learner can complete the assigned tasks;
  - ✓ tracking pupil's progress;
  - ✓ involvement, if necessary, of specialists from the first and second strategies.

ACTION NUMBER ONE

- **Teacher's tasks:**
  - ✓ Identifying the talented learner's areas of interest and abilities
  - ✓ Adapting the curriculum and instructional materials to meet the learner's unique needs
  - ✓ Providing challenging and stimulating tasks that engage the learner 's curiosity and creativity
  - ✓ Offering personalized feedback and support to help the learner grow and develop
  - ✓ Collaborating with other teachers, specialists, and parents to provide a comprehensive and coordinated approach to the learner's education
  - ✓ Continuously assessing the learner's progress and adjusting instruction as needed to ensure continued growth and development

- **Implementation process**

Offline Implementation	Online Implementation
Identify passionate and trained teachers.	Conduct digital classes using digital tools for content delivery.
Assess learner's abilities and tailor tasks.	Create a digital classroom with multimedia resources.
Adapt educational materials for individual needs.	Use online platforms for collaboration with the educational community.
Create a supportive learning environment.	
Monitor progress and adjust teaching strategies.	
Involve other specialists as needed.	

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ACTION NUMBER TWO

- **Teacher's tasks:**
  - ✓ Identifying the specific subject areas in which the learner has extraordinary abilities
  - ✓ Identifying opportunities for the learner to study with older learners in those subject areas
  - ✓ Working with the learner to develop a personalized plan for studying with older learners, including specific learning goals and objectives
  - ✓ Monitoring the learner's progress and adjusting the plan as needed to ensure continued growth and development
  - ✓ Providing emotional support and guidance to the learner as they navigate the challenges of studying with older learners
  - ✓ Collaborating with other teachers, specialists, and parents to provide a comprehensive and coordinated approach to the learner's education.
- **Implementation process**

Offline Implementation	Online Implementation
Identify knowledgeable older peers as mentors.	Enroll the learner in online courses designed for older pupils.
Assess learner's abilities with the help of mentors.	Access digital libraries and research tools for independent study.
Design individualized tasks with mentors.	Engage with online communities for support and idea exchange.
Create a supportive environment for learning.	
Monitor progress and adjust learning plans.	
Involve other specialists as needed.	

GROUP LEVEL (SMALL GROUP)

Fourth strategy "Special interest group organisation" *(Renzulli et al., 2022)*

- **Action:** organisation of a non-formal education system (in parallel to the formal one) throughout the educational institution, based on the creation of interest clubs
- **Purpose**: to unite the talented learners into small groups (up to 10 people) according to interests and extraordinary abilities - into clubs with a single idea
- **Requirements:** the presence of club members (minimum 5 people), the presence of a charter and a mentor
- **Functions:**
  - ✓ providing the necessary level of communication and support for the talented learner;
  - ✓ creating an emotionally safe environment for presenting your ideas and opportunities;
  - ✓ creation of a platform for the implementation of ideas;
  - ✓ developing a sense of belonging and responsibility for club members.
- **Main tasks:**
  - ✓ Identification of interests and extraordinary abilities of the talented learners and formation of small interest clubs (up to 10 people) according to their interests.
  - ✓ Identification of a mentor who is experienced and passionate about the subject area of the club to provide guidance and support to the members.
  - ✓ Development of a club charter that outlines the goals and objectives, responsibilities of the members, and the rules of conduct.

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- ✓ Creation of a safe and supportive environment where club members can share their ideas, experiences, and opportunities for personal and group development.
- ✓ Provision of necessary resources and tools for the club members to implement their ideas and initiatives.
- ✓ Promotion of a sense of belonging and responsibility among the club members by encouraging participation, collaboration, and leadership development.

➢ **Implementation process**

Offline Implementation	Online Implementation
Assess interests: identify learners' talents and interests through surveys or interviews.	**Digital clubs:** establish clubs on digital platforms with meetings via video conferencing.
Form clubs: create interest-based clubs, each centered on a specific theme or activity.	**Digital tools:** use online collaboration tools for project development and resource sharing.
Select mentors: assign a knowledgeable mentor to each club to guide members.	**Social media:** utilize social media for club communication and showcasing projects.
Establish charter: develop a club charter outlining the mission, activities, and rules.	**E-learning platforms:** use learning management systems for structured activities and discussions.
Schedule activities: organize regular club meetings and project sessions.	**Online resources:** provide digital materials and tools for members to implement their ideas.
Ensure support: maintain a welcoming environment for open idea sharing.	**Community engagement:** foster participation and leadership through online forums and discussions.
Monitor progress: track the club's achievements and provide feedback.	**Continuous feedback:** use digital platforms for progress tracking and mentor feedback.

Fifth strategy "Special corner organisation" *(Laine, & Tirri, 2016)*

- ➢ **Action:** due to the regrouping of parallels, talented learners of the same age is distributed for classes in each academic subject into groups that take into account their similar abilities and interests
- ➢ **Goal:** transformation of the curriculum so that each talented learner within the same class has an individual programme for potential development
- ➢ **Functions:**
  - ✓ assessment of the potential of each talented learner, identification of individual abilities in a particular area;
  - ✓ formation of an individual programme - the division of subjects into profile and ordinary;
  - ✓ grouping into a small group (no more than 6) of talented learners from all parallels only for a specific subject to which they have a predisposition - this is an advanced group;
  - ✓ **the talented learner takes general education subjects in his class**.
- ➢ **Teacher's tasks:**
  - ✓ The teacher needs to assess the potential of each talented learner, identify individual abilities in a particular area, and create a profile for each talented learner.
  - ✓ Based on the assessments, the teacher should create an individual programme for each talented learner, dividing the subjects into profile and ordinary. The individual programme should be focused on developing the talented learner's potential and should take into account their interests.

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- ✓ The teacher should manage the classroom to ensure that the talented learners are working on their individual programmes and to provide support to the advanced group in the subject they have a predisposition for.
- ✓ The teacher should track the progress of each talented learner and make adjustments to their individual programme as necessary.
- ✓ The teacher should communicate regularly with parents to keep them informed about their child's progress and to solicit feedback.
- ✓ The teacher should collaborate with other teachers and specialists to ensure that the needs of each talented learner are being met and to provide support as needed.

➢ **Implementation process**

Offline Implementation	Online Implementation
Assess pupil potential: use tests and observations to understand each pupil's unique abilities and interests.	**Digital assessments:** employ online tools to evaluate pupils' strengths and interests.
Develop individual programmes: tailor educational plans to differentiate between specialized and general subjects.	**Virtual programmes:** create personalized learning plans on the digital platform, covering both profile and general subjects.
Form advanced groups: organize small groups for advanced study in profile subjects, pulling pupils from various classes.	**Online advanced groups:** set up digital forums or groups for collaboration on specialized subjects.
Integrate general education: ensure pupils also engage in general education subjects with their regular classes.	**Comprehensive online learning:** provide access to general education materials alongside specialized content on the learning platform.

GROUP LEVEL (LARGE GROUP)

Sixth strategy "Special skills development centre organisation" *(Kang, 2019)*

- ➢ **Action:** organisation of a non-formal education system (in parallel to the formal one) throughout the educational institution, based on the creation of a centre for the development of abilities for the talented learners
- ➢ **Purpose:** to unite talented learners of all ages into a group within one educational institution
- ➢ **Requirements:** the presence of the head of the centre, psychological support and self-government of the centre in the form of the talented learners
- ➢ **Functions:**
  - ✓ providing the necessary level of communication and psychological support for the talented learners;
  - ✓ development of a mentoring system within the development centre;
  - ✓ creating an emotionally safe environment for the implementation of projects.
- ➢ **Main tasks:**
  - ✓ The first step is to establish the centre for the development of abilities, which involves setting up the physical infrastructure, recruiting the head of the centre, and appointing a team of psychologists and mentors to support the talented learners.
  - ✓ To identify the individual strengths and potential of the talented learners, assessment tests and interviews can be conducted.

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- ✓ A mentoring system should be set up within the development centre, where each talented learner is assigned a mentor based on their interests and abilities. The mentor should provide guidance and support to the talented learner for the implementation of their projects.
- ✓ The development centre should create a supportive environment that encourages talented learners to pursue their interests and develop their skills through the implementation of various projects. The centre can organize workshops, seminars, and training sessions to help the talented learners acquire the necessary skills to execute their projects.
- ✓ The centre should be run by the talented learners themselves. This helps in developing leadership skills, teamwork, and a sense of responsibility among the talented learners.
- ✓ The development centre should provide psychological support to the talented learners to help them deal with any emotional or psychological issues that may arise. This can be done through individual or group counseling sessions.
- ✓ The development centre can facilitate networking opportunities for the talented learners to connect with other talented learners and experts in their respective fields. This helps them to expand their knowledge and learn from others.

➢ **Implementation process**

Offline Implementation	Online Implementation
Centre setup: establish a physical centre with designated leadership and necessary facilities.	**Virtual centre:** create an online platform to serve as the virtual counterpart of the physical centre.
Support system: implement a psychological support system within the centre.	**Online support:** offer psychological counseling and support through digital channels.
Mentorship programme: develop and initiate a mentorship programme connecting learners with experienced mentors.	**Digital mentorship:** facilitate mentor-learner interactions and project guidance online.
Learner leadership: encourage self-governance and leadership roles among learners within the centre.	**Online governance:** enable learners to take on leadership roles and manage projects through online forums and management tools.
Project environment: provide a safe and supportive environment for learners to work on and present their projects.	**Virtual collaboration:** utilise online tools and platforms for project collaboration and presentation.
Progress evaluation: regularly assess the learners' development and the impact of the centre's activities.	**Continuous feedback:** use online platforms for monitoring progress, providing feedback, and adjusting projects as necessary.

Seventh strategy "Special class organisation" *(Tomlinson, 2012)*

➢ **Action: transformation of the curriculum** - by reducing the time to complete the compulsory programme, part of the usual classes is replaced with classes that meet the cognitive needs of the talented learners

➢ **Purpose**: to unite talented learners of the same age within the framework of one educational institution into a single class

➢ **Functions:**

- ✓ assessment of abilities;

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- ✓ transformation of the curriculum - reduction of training in the compulsory programme and instead a programme with a bias in any specifics is provided;
- ✓ integration and adaptation of a pupil in a class with talented learners;
- ✓ if necessary, the organisation of psychological support.

➢ **Teacher's tasks:**

- ✓ Assessing the abilities of each learner to determine the areas in which they excel and those that require additional support.
- ✓ Developing and implementing a personalised programme for each learner that aligns with their strengths and interests.
- ✓ Providing support and guidance to learners as they integrate into a class with other talented learners.
- ✓ Monitoring and evaluating the progress of each learner to identify areas of growth and further development.
- ✓ Collaborating with other teachers, administrators, and support staff to ensure that learners receive the resources and support they need to succeed.

➢ **Implementation process**

Offline Implementation	Online Implementation
Assessment of abilities: conduct thorough evaluations to identify talented learners based on diverse abilities.	**Virtual assessments:** utilize online tools and assessments to identify talented learners' strengths and needs.
Curriculum transformation: modify the curriculum to include advanced classes tailored to talented learners' interests.	**Customised online curriculum:** develop specialised online modules and courses that cater to talented learners' cognitive needs.
Integration of learners: group talented learners into a specialised class, ensuring a conducive learning environment.	**Digital class integration:** create an inclusive virtual classroom environment that fosters collaboration among talented learners.
Psychological support: provide in-person counselling and support services to assist learners in their adaptation.	**Online psychological support:** offer virtual counselling sessions and online support groups for talented learners.
	Interactive learning platforms: use digital tools and platforms to facilitate interactive learning and project collaboration.
	Parent and teacher collaboration: leverage online communication tools for continuous collaboration and feedback among educators and parents.
	Continuous online monitoring: implement digital tracking and feedback mechanisms to monitor learners' progress and adjust the programme as needed.

For the full description, please refer to the complete document attached.

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Strategy of implementation

In some countries, including Belgium and Latvia, there are schools where talented learners go one or more times a week to a separate class, called Kangaroo class, to work alone or in groups on projects that offer a high level of difficulty.

This is not always easy to organize, because you need additional staff, trained in this other way of teaching. In addition, it can induce a negative climate between learners who attend Kangaroo Class and others.

Kangaroo corner or learning centres: practical details

Learning centre is therefore a pedagogical differentiation technique that makes it possible to offer learners activities that take account of their individual needs (interests, preferences - learning abilities and pace). These activities will help to develop the skills of all learners and the different talents of talented learners.

Once they have completed the exercises that are considered compulsory, the learners enter the centre in a learning process that is flexible but governed by a set of operating rules. Within each centre, the educator can vary the content (levels of abstraction, complexity and according to the skills to be developed), the learning processes (use of different pathways to understand the content) and the expected output, while paying particular attention to the classroom climate (a positive and reassuring socio-affective environment is an essential prerequisite for learners' cognitive readiness).

For each topic covered, the educator will be able to develop a series of questions to gradually bring the learners to higher and higher levels of thinking by varying the intellectual processes (recognising, understanding, applying, analysing, evaluating and creating) and the types of knowledge (factual, conceptual, procedural and metacognitive) that the learners will have to mobilize according to their current threshold of competence.

When building one of these centres, care must be taken to determine the type of centre (to explore/discover a new subject, to learn in greater depth or to experiment), the physical organisation (the type of support on which the centre will be created), the management (who can do what, when and where) and all the operating components.

Types of centre

To determine the type of centre, the educator will decide on the level of depth of the subject, whether or not it is possible to handle materials, and the time and space available.

For a first approach to a subject, concept or area of interest, the educator will propose an **exploration centre**. This type can help learners discover new areas of knowledge as well as new areas of interest.

To enable learners to deepen their knowledge while handling equipment and testing different methods, the educator will offer a **training centre**.

Experimentation centres can be set up for some of the more specialized subjects, but they require a lot of space and quite a lot of dedicated time. It is often easier to carry out experiments in the form of workshops or labs.

Finally, the educator can also create **multidisciplinary centres** that offer different types of activity but also relate to different subjects, or that require the learner to make links between different subjects.

Spatial organisation

The spatial layout of the equipment must obviously respect the physical characteristics of the classroom. Corners, walls and the back of the classroom can be used to set up **wall centres** (where learners read the

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information on the wall and then return to their benches to work alone), booths (for learners who need peace and quiet to concentrate) and/or easels (providing storage space that wall displays do not have).

When there is very little space available, the centre can be **suspended** (e.g. with clotheslines). Conversely, when there is enough space available, four types of centre can be set up.

The **listening centre** allows learners to work on their listening skills (in a quiet environment). The **computer centre** allows learners to discover or deepen their knowledge of different computers and/or digital media. Finally, the **table-top centre** or **mobile centre** (which can be moved from classroom to classroom) allows learners to handle materials on their own or in small groups.

Management

The educator must also think about the management of each centre when it is created, in order to publish clear operating rules that all learners must respect.

The **presentation of the centre and the activity** explains to the learners what the objectives are, how to carry out the workshop, how to manage the equipment, and what is and isn't allowed during the workshop.

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The way in which **learners are assigned** determines who will decide which workshop the learner will do. Depending on the type of activity, the time of day and the learner, there are several possibilities. Either it's the educator who assigns each learner individually, or it's the learner who chooses according to his/her project, or it's via the roadmap (the learner notes each time that he/she has completed a workshop and looks at the workshops that he/she still has to complete) or finally a learner rotation has been pre-established.

When it comes to **supervising and marking activities**, the educator has several options, depending on the type of workshop or the learner. The educator can correct each time a learner has finished, or they can correct on a one-off basis, i.e. go over the activity sheets once a day, once a week, etc. Alternatively, the learners can correct themselves using self-correction grids or via a peer or a presentation of their work in front of the class.

Establishing routines for the learners enables them to determine and learn the different steps to be systematically carried out for any workshop or activity in the learning centre.

Components

Each centre must include the following components (during its creation, implementation and use) so that learners can carry it out while developing their autonomy. Firstly, when creating it, the educator should think about the classification of the activity (level of complexity, type of activity and centre), the amount of work required, the estimated time needed to complete it and the sturdiness, aesthetics and accessibility of the material. Then, each activity sheet must include the title and number, a detailed presentation of the activity to be carried out, the specific rules to be followed, the improvement techniques (different ways of carrying out the activity), the users' record and the type of correction at the end of the activity.

To develop learning centres in the classroom, educators can draw on various models that will enable them to gradually introduce differentiated teaching to meet the needs of the talented learners in their different classes.

Kangaroo corner: theoretical bases

Tomlinson model (2014)

According to Tomlinson's model (2014), presented in Figure 1, the educator will be able to act at three different levels in order to meet the needs of the talented learners in terms of interests, motivation and learning (preferred methods, abilities and pace) while respecting different pedagogical principles.

The **first level** on which the educator can act concerns the choice of content to be worked on in class, his or her pedagogical intentions, i.e. the skills and knowledge that the educator wants the learners to acquire and the skills that will be trained to teach the learners to work independently. To do this, the educator can vary the level of abstraction required (from concrete handling of materials to working on sheets of paper, to transferring to other skill areas), the level of complexity (adding one or more elements of challenge depending on the learners) and the subjects covered (proposing to address the learners' centres of interest). Educators can also suggest studying and using different techniques or methods depending on the subject, or discovering the careers of people with special talents (scientists, top athletes, artists, etc.).

The **second level** of response to learners' needs concerns the learning process. Educators will be able to suggest several possible ways for learners to understand the content presented. To do this, they can organize their classes and lessons in ten different ways:

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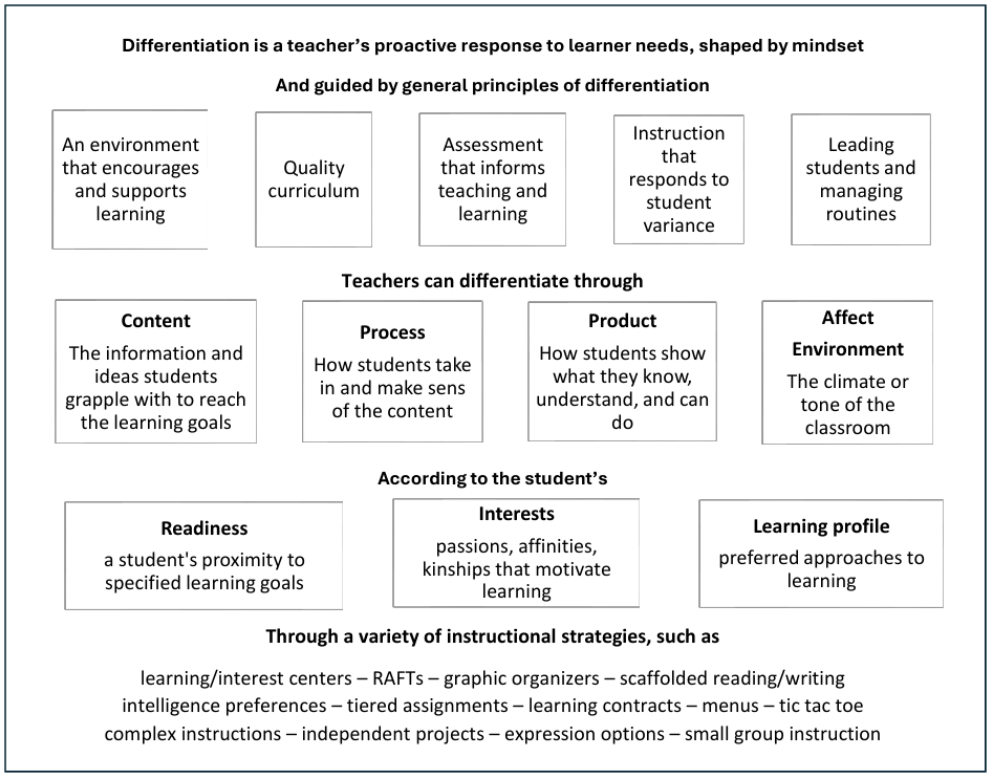
1. *The creation and/or construction of learning centres encourages each learner to work independently, but requires the physical layout of the classroom.*
2. *The use of available technologies will also encourage independent learning and help to compensate for the learning deficits of certain learners.*
3. *Talented learners are grouped according to their particular needs (homogeneous and heterogeneous groups), the time of day and the type of subject.*
4. *Flexible planning of the day and week according to the needs of each individual, the receptiveness of the talented learners and their speed of understanding and completing the exercises.*
5. *The opportunity to work on challenges requiring higher levels of thinking: going beyond the levels of knowledge, understanding and application in order to gradually develop critical thinking.*
6. *Learning to be open-minded and creative through open-ended questions, questions of opinion and creative activities in which several answers are always possible.*
7. *Problem-based learning involves the talented learner actively seeking out problems and solving them. The talented learner is therefore an investigator and the educator a facilitator or metacognitive coach who enables the learner to learn how to learn.*
8. *Work based on research and discovery requires talented learners to use inductive reasoning to find ideas, models and concepts.*
9. *The development of metacognitive strategies enables the talented learner to objectify the strategies used, to criticize them and to improve them. Talented learner will gradually develop new reasoning strategies.*
10. *By varying the pace of presentation, the educator is able to adapt to the needs of each learner, enabling them to progress at their own pace.*



Tomlinson's model of differentiation of instruction.

The **third level** on which the educator can act corresponds to what the learners produce, i.e. how the skills developed in class through the activities carried out are assessed.

Initially, educators can adjust their expectations according to talented learners' abilities, the time available for the subject and their particular interests. They can also give them a certain amount of freedom of choice, i.e. let them choose the subject of the work, the method of completion, the type of output (final product) or the type of assessment. Educators can also ask their talented learners to produce work that focuses on real-life problem situations (encountered at school or in their immediate environment) or on real-life products (things we might need at school and in everyday life). The educator can ask them to create original products and not just reproductions or copies. Finally, they can decide who will judge the work they have produced. The educator can do it him/herself, the talented learner can assess him/herself (on the basis of criteria given in advance) or he/she can present his/her work to the class, to parents, to a jury or to professionals in the field.

The **fourth and final level** of response to talented learners' needs concerns the classroom learning climate. This is of paramount importance because it conditions the cognitive and emotional investment of the learners.

Anderson and Krathwohl model (2001)

This model is a revision of Bloom's taxonomy (1956) that uses different intellectual processes and types of knowledge to best differentiate learning for all learners in the class, regardless of their difficulties, learning disabilities or talents. This model can be used to design and select enrichment activities at different levels of complexity, whatever the age of the talented learners and the subject. It will enable the different elements of response (seen in Tomlinson's model) to be integrated: content (abstraction, complexity and variety), learning preferences (pace, freedom of choice, levels of thinking) and expected output (type of assessment).

Six cognitive processes

The educator will be able to create instructions and questions based on the verbs associated with the different thought processes (see Table). Activities can then be proposed to talented learners according to their abilities and level of progress in the subject.

Remember: The most basic thought process is linked to recognition and recall, retrieving relevant knowledge from long-term memory.

Understand: This process enables the meaning of the activity including written, graphic and oral communication. This process already involves interpreting, exemplifying, classifying, summarizing, inferring, comparing and explaining.

Apply: This process involves using what has already been learnt. Talented learners will have to use their knowledge in concrete situations according to rules, methods, concepts or theories. So it involves executing and implementing processes.

Analyse: This process involves breaking down the task into its various constituent elements in order to highlight the relationships between these elements. This process requires mastery of the content and structure of the subject. This means that the talented learner must first have recognised and understood it and will use differentiating, organising and attributing processes.

Evaluate: This assessment process must use precise criteria, internal standards (structure used, content) and/or external standards depending on the objectives set beforehand. This assessment will pass judgement on the value of the talented learner's production.

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Create: This process is possible at both the intellectual and artistic levels. This process involves bringing together parts and elements to form a whole or a new whole. It requires drawing up a work plan (generating) and following it step by step (planning) to finalise the process (producing).

Cognitive processes	Verbs
Remember	Acquire, say, associate, surround, choose, enumerate, complete, list, describe, name, define, specify, designate, recite, draw, distinguish, list, duplicate, write, spell, recount, recall, search, recognise, link, highlight, trace
Understand	Associate, choose, classify, compare, describe, illustrate, redefine, explain, paraphrase, reformulate, reorganise, summarise, situate, translate, annotate, comment, complete, demonstrate, determine, differentiate, discuss, distinguish, elaborate, estimate, interpret
Apply	Calculate, classify, construct, demonstrate, distinguish, elaborate, experiment, illustrate, interpret, model, organise, write, draw a diagram/graph, prepare, carry out in stages, simulate, use
Analyse	Associate, categorise, classify, compare, contrast, correlate, decompose, determine, differentiate, investigate, estimate, explain, extrapolate, induce, integrate, order, identify, deduce, discriminate, validate, test, experiment
Evaluate	Argue, attribute, conclude, criticise, debate, defend, evaluate, refute, quantify, comment, decide, determine value, estimate, give opinion, establish, validate, check
Create	Adapt, improve, combine, compose, design, build, animate, assemble, construct, draw, develop, elaborate, film, formulate, imagine, install, invent, model, produce, project, programme, tell, synthesise

Examples of verbs corresponding to the different cognitive processes for creating instructions (Massé et al. 2021)

Four types of knowledge

Factual knowledge is a declarative knowledge that learners must know within each discipline. It can be separate into knowledge of terminology (i.e. periodic classification of elements in chemistry and Greek letters in mathematics), and knowledge of specific details and elements (i.e. dates, places and events in history).

Conceptual knowledge is complex declarative knowledge about the organisation and structure of a set of categories in a systematic way, enabling them to function together. This level can be separate into knowledge of classifications and categories, knowledge of principles and generalisations, and knowledge of theories, models and structures. For example, to understand how the seasons work, we need to look at what we know about the Earth, the Sun, the Earth's rotation around the Sun and their relationship.

Procedural knowledge concerns the learning of know-how and methods for carrying out specific tasks. It is linked to a given field of expertise. It is therefore difficult to generalise and varies according to context and objectives. This procedural knowledge is acquired gradually through prolonged practice, feedback and

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formative assessment. Obviously, not all knowledge of actions is transposed into verbal form. Exercise in a variety of contexts encourages progressive improvement in the execution of the action, leading to truly skilful execution of this knowledge. This level can be separated into knowledge of subject-related skills and algorithms, knowledge of subject-specific techniques and methods, and knowledge of criteria for determining when to use appropriate procedures.

Metacognitive knowledge refers to the learner's self-knowledge about his potential, his own strategies and those of others. Strategic knowledge enables us to determine the most appropriate work strategies for specific situations. Knowledge of tasks enables activities to be carried out more effectively thanks to knowledge of cognitive requirements (knowing which processes to use). Finally, self-knowledge includes knowledge of strengths, weaknesses, interests, motivation and use of learning processes.

The Taxonomy table

Using the table of Anderson and Krathwohl model (2001), the educator will more easily determine the different objectives of each subject in his/her course and how to create exercises according to the different profiles of the learners in the class.

		Cognitive processes					
Knowledges		Remember	Understand	Apply	Analyse	Evaluate	Create
	Factual						
	Conceptual						
	Procedural						
	Metacognitive						

Set up conditions

In order to set up a kangaroo corner and to differentiate optimally, Kieboom (2018) and Massé et al. (2021) have recommended different principles. For each activity proposed to the learners, the educator will be able to vary the type of activity, the way the activity is carried out, the questions asked during the activity and the type of assessment at the end of the activity, while encouraging the autonomy of each learner in the class and respecting their needs.

Work programme

Differentiation does not mean extra work for talented learners; the workload is the same but the work is differentiated. They need to be stimulated so that their thirst for learning is quenched and their real activities are expressed. The aim of this differentiation is to combat boredom, to find motivation and a new interest in school while remaining in class.

Differentiated teaching is possible in all subjects, from nursery onwards. The compulsory activities correspond to the core curriculum but are condensed to give the learner enough time to do the extra work without feeling that they are working harder or more than the other learners in the class. They should be given the objective and the steps they need to take to achieve it, so that they can see the usefulness of the subject and each of the steps involved. These kangaroo corner projects allow these talented learners to practice their skills and acquire others without taking them too far from the level of their class in terms of the reference of their study year.

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Behaviour

The educator must be aware of the avoidance behaviours that the learners may try to use to get out of the differentiation programme: a drop in the pace of work, the appearance of errors in the exercises, recurrent complaints that "it's too difficult". The educator must stand firm and be supported in this differentiation project so as not to be overwhelmed by doubts about the learners' behaviour. Communication between the various players (educator, parents, therapists, etc.) is essential. learners need to be stimulated and supported so that they dare to take up the challenge of complementary/supplementary exercises in the current year's curriculum.

Educators must also be aware of the negative consequences of perfectionism and the associated fear of failure. If there is a risk of making mistakes, the learner will increase the pressure and may even stop doing anything at all. A vicious circle can quickly set in and lead to dropping out of school. The learner prefers to do nothing and get a deserved '0' than to work and risk getting lower points/results than expected. They will therefore leave many questions unanswered if they are not sure, and they will not write so as not to take the risk of making a mistake. Learners also regularly need confirmation that they have understood the instructions/exercise correctly. They may also experience a gap between their thoughts and the written response, so it is important to offer them the opportunity to respond orally so that they can use their educator's non-verbal cues (facial expressions) to reassure themselves.

This vicious circle, if left unchecked, can lead to absolute under-performance (poor to very poor school results, poor attitude to work, unacceptable behaviour) and even a total refusal to do any work at all.

Selection of activities

For the same activity offered to all learners, the educator can vary the level of complexity according to the verbs used in the instructions. These will determine the intellectual process involved, the type of knowledge to be used and, therefore, the behaviour that the learners should adopt.

Development of questions

For each activity, the educator can gradually take the learners to higher levels of thinking. This also allows the educator to choose questions according to the skill level of each learner in the class, while working on a common theme. This way of working encourages the inclusion of all learners, whatever their skills profile and/or learning difficulties.

Activity planning

For gifted and/or talented learners, depending on their skills profile and interests, educators can choose the level of activity that best suits them in order to get them involved, by arousing their interest and motivation. This will also encourage the development of inductive learning, while avoiding repetitive situations and activities.

Promoting autonomy, new skills and attitudes

The first step in developing independent work is to learn taxonomy, i.e. the meaning of instructions according to the different levels of instructions and the corresponding expectations. It is therefore very important to begin with a phase of clarification with the learners to ensure that they understand and use the instructions correctly.

Secondly, they will gradually learn to structure their activities, either according to the worksheets describing the steps to be followed, or by trial and error with feedback at each stage.

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Finally, autonomy will also be developed each time the learner can choose their activity or the order in which they carry it out during the day or week. Making a project a reality requires understanding, identifying, planning, communicating well, solving problems, evaluating at each stage… These are much-needed skills in life. In addition, group work strengthens interpersonal skills and leadership. Talented learners can work together on extracurricular projects that require them to be creative and proactive.

Examples of different ways to set up a kangaroo corner

At present, with the help of digitalisation, it is possible to enrich learning by creating a "Kangaroo Corner", physical or virtual, in the classroom, so that learners who work quickly and efficiently can develop projects for the benefit of the whole class, while staying with their peers.

Flexible classroom

We have been hearing a lot lately about flexible furniture, flexible classrooms, etc. In French-speaking Belgium, for example, this phenomenon from across the Atlantic affects mainly nursery schools (2.5-5 years) and primary schools (6-11 years). In secondary schools, some educators set up one or more rooms with specific furniture and try to apply flexible teaching arrangements. However, class groups often do not have a fixed room and, depending on the timetable, many educators have to change rooms several times a week, and this hinders the use of the flexible classroom methodology.

A traditional classroom consists of narrow tables (about 50 cm) with one or two seats and simple chairs with wooden backs and seats. These tables are arranged in front of the blackboard for purely frontal teaching, in a U-shape or rectangle to allow for interaction and debate between learners, or in clusters for small group work.

The flexible classroom offers several varieties of workstations: wider and longer tables to accommodate several learners together, mats, individual cushions, ergonomic chairs with or without castors, armchairs, ball seats, pedal chairs, etc.

However, changing the furniture is not enough to achieve the objectives of the flexible classroom. It is also important to ensure that the environment meets the needs of the individual.

The aim of flexible teaching is to offer each learner a suitable workstation, to allow him or her to move around and to choose the place and material most conducive to learning according to the needs of the day and the time. Thus, according to the advocates of flexible teaching, their concentration and hence their involvement in their learning, and therefore their results, would be greatly improved.

Few studies have been conducted on the benefits of flexible teaching because the number of parameters to be observed and quantified is very large. Moreover, all flexible classrooms are different from each other. The results of research in several classes or schools are therefore difficult to interpret.

In a flexible classroom, with a philosophy of well-being and adaptation to the needs of each learner, the installation of one or more Kangaroo "corners" to carry out specific enrichment projects is quite natural.

Many suppliers offer school furniture in the spirit of flexible teaching, but it is possible to create a flexible classroom at a lower cost by adapting recycled material.

Video: Mrs Van Malsack Geography classroom in WBE Athénée Royal les Marlaires in Gosselies

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The free Sweet Home 3D software, available in 29 languages (https://www.sweethome3d.com/), is an easy to use interior design application, online or on a download basis.

Plan of a flexible didactic classroom made by Philippe Latinis (CAF) for a pedagogical college

eTwinning

eTwinning is a digital platform of the European Union that enables to develop collaborative projects:

- remotely
- by at least two classes of different European countries
- or by two classes of the same country (different schools).

eTwinning projects give an international dimension to learning, they develop a collaborative spirit and a thirst for learning. When carried out in a foreign language (mostly English), they allow us to put modern language courses into practice. The will to communicate efficiently with their partners, or eTwinners, will push learners to look for the best software or app and to learn to use them. Also, choosing an interesting topic may spark interest in seeking accurate information and investigating thoroughly.

In the Flemish-speaking part of Belgium, the concept of separate kangaroo classes for talented learners for a few hours a week is implemented at the primary education level. In one of these schools, Mrs Marie-Leet Bens, a retired French teacher, ran an eTwinning project with two talented learners. Together, they selected a topic that interested them all (the educators as well as the two boys): « The Ocean's rescuers: let's' save the oceans !!! ». This project, involving two French schools, three Italian schools, and a Belgian school, Marie-Leet's school, won an eTwinning award in 2021.

In one of WBE's primary school, there were two separate "kangaroo classrooms": one for 6-8-year-old learners and the other for 9-12-year-old ones, in addition to the two talented learners working with Marie-Leet outside of their classroom. Simultaneously, the rest of the class carried out another eTwinning project, at a more relaxed pace. The two talented learners did not have to catch up with the lessons that they missed, since they did not need it and it would have demotivated them. They did not have to present their project to the class either, though they explained a couple of times how they were planning it. They also often talked about it to their families, and their parents noticed that embarking on this project helped reconcile them with school.

Within a year, these two sixth-graders acquired a significant amount of skills, such as formulating a study plan, expressing themselves in English both orally and in writing, using online translators, compiling a photographic report, selecting relevant images, debating, providing information, attending international online meetings (and even a university conference), etc. They also learned to use a number of digital tools such as Google Drive, Jitsi, Voki, Padlet, Twinspace, Linguee, Deepl, Knipprogramma, Canva, PowerPoint, etc., as well as to create an email address, to fill in online forms, and to update a blog!

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As far as secondary education is concerned, it seems possible to us to propose to learners who tend to finish their work quickly and who do not need drill exercises, to take charge, alone or in small groups, of an eTwinning project and to develop it in class in a corner of the room physically reserved for this activity, which we would call the “kangaroo corner”: a table, chairs, and digital devices.

To join eTwinning (restricted to European educators), you must register on the European School Education Platform, which is only possible using EU login.

Once you have found your partners, the project can start.

The choice of the project must be made together between the learners involved and the educator, who must ensure that it is of added value to the class. The educator must also make sure that all their talented learners are informed of its progress, in order for everyone to somehow feel included in the project.

To complete their project, talented learners will often need help, for which they will be allowed to ask not only their educator but also all educators in the school, who may possess more specific skills. They may also approach other people, specialists in their own field. Despite the demanding nature of managing these requests, the ensuing feeling of fulfilment is well worth the time and energy spent!

Models conclusions and recommendations

How do the learners feel about it?

According to the few responses provided by educators who have applied the kangaroo methodology in their classes, all learners were more motivated. This methodology adapts well to the needs of different types of learners in the class (talented, twice exceptional, learning disabilities). It allows them to find the way that suits them best to explore the subject matter and complete the task at their own pace. They learn to understand how they function and what they like, to work together according to their friendships or interests. They can help each other and learn to listen to each other. They also appreciate the use of various tools, including digital tools. Educators highlight notable improvements in their learners regarding relationships with peers, autonomous work, communication skills, and emotional management.

How do educators feel about it?

The few feedbacks received from educators are positive regarding the kangaroo methodology in their classes, regardless of the subject they teach. They express better motivation and creativity. Lessons are more active for both educators and learners. They note a positive impact on the proposed learning processes and a diversification of ways of working in class or outside the class with various groups of learners. Having more time available for learners is seen as very positive for some because it allows them to take on a mentoring role with support only when necessary, but boring for others because they do not know how to occupy this free time.

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Levers and limits of the Kangaroo approach to vocational education and training

According to our research, relatively few studies have been published recently about talented and gifted learners in vocational education and training (VET).

A few publications prior to 2012 point to a gap in this area:

" Accordingly, even at the beginning of the 21st century, talent is associated with the successful attendance of a Gymnasium, and promotion of the talented is accredited to academic-intellectual courses. Consequently, particular talents are assumed to be present, sought-after and promoted, but not in relatively low-level schools (lower than the Gymnasium) or in professional education." (*Stamm, 2005*)

In Germany, where nearly 70% of the working population is dual-trained, a pilot project entitled "Successful apprentices - promoting apprenticeship in the long term" was carried out in 2000. The same applies to the promotion of talented learners in VET: "The promotion of particularly talented trainees in companies and vocational schools has remained the exception until now. While the concept of talent promotion has always been equated with academic talent, the phenomenon of vocational talent has so far been neglected." (*Stein, 2003*)

In this pilot study, the results of a survey of over 800 companies to determine the criteria for recognising talented apprentices are mentioned (*Pütz 1998*):

- successful trainees don't necessarily have a higher education. They can be found among other graduates;
- they are young people who are interested in training and enjoy their work. Their level of understanding is very high when tackling new tasks, and they try to complete tasks independently;
- they are willing to go beyond company expectations and try out new areas of activity on their own;
- they are flexible and adapt flexibly to new requirements. They are interested in subjects beyond the scope of their work;
- carry out assigned tasks responsibly and reliably;
- they integrate well into (work) groups and distinguish themselves by their attitude. They are friendly and cooperative, and have good people skills.

Margrit Stamm, from the University of Fribourg in Switzerland, conducted an empirical study on talent and excellence in vocational training from 2004 to 2008. For her, the excellence achieved by apprentices at the end of their vocational training is based less on traditionally recognised giftedness variables than on personality traits such as motivation to perform, or on the work atmosphere and encouragement methods used in the company. (*Stamm, 2007*)

The Belgian project team questioned a number of educators of professional practice about their attitude to their talented learners. Some of them said they did not take these skills into account, or even failed to recognise them. Among those who did take them into consideration, three types of attitudes can be distinguished:

- offer challenges during lessons (kangaroo corner attitude!);
- offer evening classes to perfect the skills (like an enrichment class);
- suggest taking part in external competitions.

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Challenge example

Olivier is a vocational practice educator in a carpentry section of ordinary secondary education at the Athénée Royal de Hannut, in French-speaking Belgium, in the senior classes (16-18 years old). When talented learners work faster and more carefully than the rest of the group, he assigns them tasks that go a little further than the programme and are meaningful. The other learners help as much as they can. This year, the class's efforts focused on building a library train for the basic school attached to their secondary school. A source of immense pride for the learners, who were congratulated by the principal and, above all, by the admiration in the eyes of the primary and nursery school children!




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Example of advanced training via evening classes

François, WBE's educational consultant, was a culinary arts educator, notably in the 7th year of the catering section at the Institut des Techniques et Commerces Agroalimentaires in Suarlée. Passionate about "ephemeral" sculpture, first on fruit and vegetables and then on ice, he was keen to pass on this art to his learners. The idea was to introduce them to an Asian art form that is still little known in Europe; but also to bring out their creativity within the culinary professions, and to reconcile gastronomy and decoration. While some learners found it difficult to handle tools, reproduce techniques and create compositions, others were quick to evolve and discover their true talents. The most enthusiastic enrolled in his evening classes (6 hours a week for one year) to learn more techniques and develop their talent, and it was there that he could guide them towards excellence.

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Motivation through Individualisation

***Dr. Ulrike Moser**, Talente Upper Austria, Specialist in Gifted Education*

The theory

Motivation plays a vital role in everyday school life. We often want to motivate our learners in various subjects by trying to implement a variety of different teaching methods.

First of all, we have to distinguish between intrinsic and extrinsic motivation. As the term implies intrinsic motivation comes from within, while extrinsic motivation arises from external factors. When you are intrinsically motivated, you engage in an activity because you enjoy it and get personal satisfaction from doing it. When you are extrinsically motivated, you do something in order to gain an external reward.

The main factors of intrinsic motivation are: fun, content (belonging, social interaction), choice (autonomy, control), care (recognition, mentorship), competence (mastery), progress (assessment), purpose (meaningfulness).

There are also various factors of extrinsic motivation. Extrinsic motivation is a catalyst for action that is driven by external rewards. These can be tangible, such as money or grades, or intangible, such as praise or fame. This means that extrinsic motivation focuses purely on outside rewards.

When we think of teaching we know that very often it is a mixture of both. When it comes to gifted learners, we have to take a lot of factors into account. Apart from various techniques and methods the personal contact and relationship to the gifted learner plays an absolutely essential role.

Characteristics of “gifted education“

- ✓ Gifted education goes deeper.
- ✓ Gifted education asks … and does not always give answers.
- ✓ Gifted education brings interests and strengths to light.
- ✓ Gifted education hands over responsibility to learners.

Strategy of implementation

In order to implement the various methods we have to be convinced that school development without support of gifted and talented learners is inconceivable and does not meet the current needs of our learners.

- ➢ Promotion of talent is the basic justification for schools.
- ➢ The promotion of talent is a very specific, pedagogical disposition that is both accessible and appropriate to educators in all schools.
- ➢ Learning conditions have to be improved.

Set-up conditions

The teacher has to become aware of the giftedness of the learners in class and decides which model fits best to meet the needs of the learners.

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Models Conclusions and recommendations

All these methods do not just support gifted learners, but are also applicable to learners with specific interests. Furthermore they also mean an advantage for all other learners as they can work at their own speed and are therefore not “forced“ by the very able ones.

Contracting

Contracting is a contribution to the individualization and democratisation of teaching.

As the word implies a contract is concluded - between an entire class and their educator or the educator and individual learners. The contract is put up by the learners and the educator together. Each of them must be happy with the different points mentioned in the contract and every single participant has to sign the contract. That might take some time.

The contract may concern the following fields:

- ✓ attendance in lessons
- ✓ contents – always with regard to the curriculum
- ✓ methodological approach and implementation
- ✓ assessment (weighing of sub areas: written tests, active participation in class, homework etc.)

Contracting - How do learners feel about it

The learners feel they are taken seriously, as responsibility for their own actions and behaviour is handed over to them. Communication takes place at eye level.

Contracting - How do educators feel about it

Only educators who are really convinced of this method should go for it. The amount of work involved should not be underestimated. The educator must be aware of the fact that this method does not work with every class.

Compacting – Acceleration – Enrichment

Compacting: is based on cooperative decision – making and creativity on the parts of both learners and educators. Time saved through curriculum compacting can be used by the educator to provide a variety of enrichment opportunities for the learner. The aspect of the compacting process should also be viewed as a creative opportunity to serve as a mentor to learners who are not working up to potential.

Enrichment refers to the presentation of curriculum content with more depth, breadth, complexity or abstract-ness than the general curriculum.

Acceleration, in the world of gifted education, refers to any means of matching the child`s ability and level of motivation with advanced content. Among the many forms of acceleration are grade-skipping, early entrance to kindergarten or college, dual-credit courses such as Baccalaureate programmes and subject-based acceleration.

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Compacting – Acceleration – Enrichment - How do the learners feel about it

There are a lot of sources dealing with that question. To cut it short: a very high percentage of high - ability learners reported satisfaction with their acceleration experience. Those who were not that satisfied, mentioned that they would have preferred more acceleration. Some spoke of an excellent experience. Being taught not more of the same seemed to be one of the biggest advantages.

Compacting – Acceleration – Enrichment - How do the educators feel about it

As it is educators who introduce that method to the learners, they are mostly very satisfied. As they can prevent boredom in the very- able learner, that means a huge advantage when teaching a whole class.

Revolving-Door Model

That Revolving-Door (Swing Door) Model is an excellent method to avoid tediousness (destructive to motivation) by redundancy.

Learners can either attend classes in a well mastered (compulsory) subject at a higher level, which is kind of a (partial) jumping of classes and therefore also a form of acceleration.

It can also be a form of an individual project of self – access learning in a field of special interest. That would be a form of enrichment.

Learning an additional language could also be a form of that model.

An educator introduces that model to learners if they are “far ahead” in a subject, if they are “experts”, if they seem to be bored. The learners can skip parts of the regular lesson and as mentioned above either attend subjects in another (higher) class, learn an additional language or work on their own project (for a limited period of time, e.g. 4-6 weeks). Concerning the finally mentioned method the learner has to have a so-called log-book to document their work and progress, individual, methods, outcome etc. Of essential importance is a kind of result either in the form of a written paper or a presentation in front of the class, which means a win-win situation for everybody.

Revolving-Door Model - How do learners feel about it

Those learners who choose that model are absolutely motivated, not bored any longer and enjoy the feeling as “being seen“. After a couple of weeks they enjoy working on another project. If they have chosen to learn a further language this usually covers a couple of years.

Revolving-Door Model - How do educators feel about it

Now as the gifted learners work on their own project and at their individual speed, that takes also stress from educators as they can concentrate better on the other (often average) learners.

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Flipped (inverted) classroom

In the flipped classroom, learners complete learning normally covered in the classroom in their own time (by watching videos and/or accessing resources), and classroom time is dedicated to hands-on activities and interactive, personalized learning, leading to deeper understanding. With today`s technology there are many ways an instructor can deliver course contact outside the classroom.

The four pillars of flipped learning are:

F - Flexible Environments

L -Learning Culture

I - Intentional Content

P - Professional educators

These four pillars are the foundation of an effective flipped classroom, as well as successfully employing blended instruction in your class. In all flipped classroom models, the educator is available to facilitate discussion, guide learning, and help learners problem-solve as they work through a concept. Learners are responsible for completing the learning activities by a particular due date.

Here are the 7 steps (for an educator) to Flipping a Classroom in an Educational organisation:

- ✓ Assign a reading or a video
- ✓ Create interesting videos
- ✓ Set up a learning module
- ✓ Get some feedback
- ✓ Make use of different discussion platforms
- ✓ Engage in application activities
- ✓ Get out of the classroom

Flipped (inverted) classroom - How do learners feel about it?

Talented and very motivated learners like the method as they can study at their own pace. Quite a few of them stated that it makes their learning process more enjoyable. But there are also those learners who prefer the face-to-face lessons in which they can question teachers in order to clarify their understanding.

Flipped (inverted) classroom - How do educators feel about the Flipped classroom?

Most educators who have used that method would recommend it. It is flexible and learners can learn at their own pace. They also take responsibility for their learning. The role of the educator is of immense importance as the instructions have to be very precise and a lot of books, sources and/or video clips have to be offered. This method is best applicable with talented learners.

That method is one of the most often discussed ones.

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Portfolio

The main idea behind a Portfolio (assignment) is "self-determined" learning. It is not "having knowledge" imparted (for reproduction) as a passive receiver, BUT it is "active, individual construction" of knowledge and therefore proving practical competence.

Assignment is very similar to portfolio with the main difference that the term assignment is usually used in gifted education. The second difference is that the assignment deals with one topic that should be dealt with from various points of view. A further point is that assignments are usually marked.

The main aspects are:

- ✓ Self-organisation of the learning process (time and energy invested, individual focus, preferences of learning style, …)
- ✓ Accepting responsibility for one`s own choices (methods, goals, objects of research, ...), personal values (- reliability)
- ✓ Participation as equal and active members of the "system" ("democratisation") with a faculty for influencing (matters of school organisation e.g. flexible attendance regulations, educator, parent, learner forum for an interchange of ideas……; teaching practices, criteria of assessment (contracting, feedback)

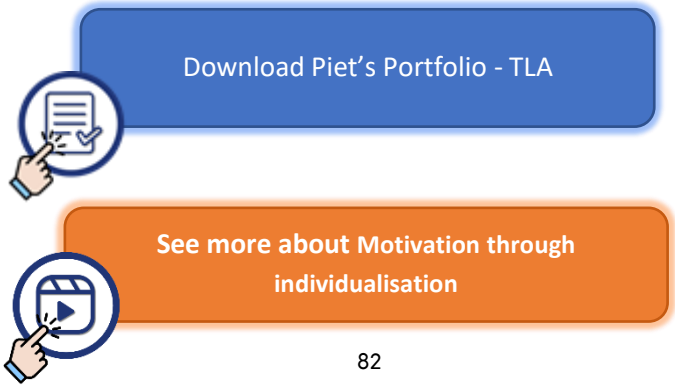
Example: Over a period of some weeks learners have to write a portfolio. This can include tasks to various topics with a variety of tasks such as reading, watching videos, internet research, text writing or a lot of tasks in mathematics etc. The learners can work on their portfolios at home as well as during their lessons (that also depends on the educators). Self-reflection of the learner should also be included in a portfolio. Also the Lay-out should be of relevance. The learners have to hand in their portfolio after that period of time. The educator can either mark the portfolio and take it as part of the learner`s mark or write a detailed feedback.

Portfolio - How do learners feel about it

Learners usually enjoy portfolios as they can work at their own speed, they can deal with topics of their interests and work individually. This was stated by gifted learners as well as learners of average cognitive abilities.

Portfolio - How do educators feel about it

Educators experience the motivation of the majority of learners and the chance of improving the method of "self-determined" learning. The disadvantage is that reading, marking and giving feedback means an enormous workload for the educator.



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In curricular and extra curricular extension programmes

Walli - School autonomous model

***Mag. Jochen Rauber**, Walli coordinator BRG Wels Wallerstraße, Austria*

Walli is a timetable and subject-independent elective course system for the junior grades at the high school BRG Wels Wallererstraße. After years of planning and preparatory work, we have succeeded in introducing this innovation, which is unique in the nearby educational region.

Walli courses are chosen from the 2nd to 4th classes (years 6-8) of the science branch and 2nd to 3rd classes (years 6-7) of the sports branch. In six course stages across the school year, various courses from different areas of interest will be offered for free choice. At each stage, the learners can choose a course according to their interests and talents. The range of courses changes with each stage, with courses of high demand being held several times per school year. However, during the two stages, remedial courses in homework subjects are offered.

All in all, this means that each learner at our school will do a total of six different courses within a school year. These are held in a double unit per week and always take place on Wednesdays in the 3rd + 4th unit (= middle of the day / middle of the week). Courses for the 2nd graders take place across classes, courses in the 3rd and 4th grades are held across classes and years, the exception being remedial courses in homework subjects. Furthermore, these classes cannot be chosen, as class teachers enlist learners who need to catch up.

Depending on the offer per stage, the Walli courses can be selected from the following subject areas:

- ✓ humanities
- ✓ languages
- ✓ natural sciences
- ✓ geography, history
- ✓ IT
- ✓ sports science, nutrition science
- ✓ home economics
- ✓ drama
- ✓ art and creativity
- ✓ design and technology
- ✓ current affairs
- ✓ new technologies and new media
- ✓ social studies
- ✓ music
- ✓ art and creativity
- ✓ design and technology
- ✓ current affairs
- ✓ new technologies and new media
- ✓ social studies
- ✓ psychology and philosophy
- ✓ sports

See more about Walli class

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Welios® - Hands-on museum

***Dr. Cordula Stroh**, Welios Science Centre, Wels, Austria*

Science centres

Science centers are hands-on museums that allow visitors to experience numerous phenomena from nature and technology. Visitors can explore numerous experimental stations and experience science and technology with all their senses to “grasp” the world.

Welios Science Centre

The Welios Science Centre in Wels, Upper Austria, was founded in 2011 and displays around 180 exhibits on the topics of technology and natural sciences. All visitors are welcome to really use these hands-on experiments.

Learning in this hands-on museum takes place in a playful way through the direct experience of natural phenomena, through challenges that we face in workshops, through science shows that make us wonder and encourage us to think and ask questions. In addition, creativity is stimulated by tinkering with the exhibits together with friends or family.

The exhibits support self-directed and discovery learning:

Sensory Stations, Interactive Exhibits, Multimedia Installations, Documentary Films, Texts, Images, Graphics and Pedagogically Trained Staff. This enables educational work for kindergarten children and elementary school learners as well as for learners from the lower to the upper school and vocational schools.

Learning by doing hands-on experiments:

- Discovering and observing natural phenomena
- Trying out experiments and constructions
- Inventing and modifying experiments
- Developing, expressing and verifying assumptions
- Documenting results
- Experiencing detours
- Working in a group
- Evaluating, presenting and discussing results

Supporting highly gifted learners

In cooperation with Talente Oberösterreich (Talente Upper Austria), Welios Science Centre has been offering courses for highly gifted learners at different ages since 2011 (the year the Welios was founded).

In particular, these are

- ✓ Mathematics courses
- ✓ 3D printing courses
- ✓ Loudspeaker construction
- ✓ Electric motor construction
- ✓ Color mixer construction
- ✓ General physics courses without thematic focus

We encourage talented learners in special workshops that incorporate the exhibits. Using worksheets, the learners are given tricky tasks to solve and questions to think about further.

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Mathematics and physics workshops lay the foundations for further exhibits in the exhibition. In mathematics, for example, the Euler bridge problem can be discussed. The theory learned must then be applied to exhibits in the Science Centre. It is also possible to start with the exhibits in a playful way and incorporate them into the workshop. Examples include exhibits that focus on the connection between electricity and magnetism or on color reproduction on displays.

Motivation

"To play is the highest form of research", Albert Einstein once said. A hands-on museum is all about playing and having fun to better understand and get to know nature and technology. A science centre thus provides motivation to think further and keep at it.

https://www.welios.at

See more about the EU Project Welios

Download Anastasia's ePortfolio – Museum TLA experimentation

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Chapter 3: Strategies to improve social skills and social inclusion for talented learners

All learners should have the right to reach their full potential. If learners are shy or if they are avoiding talking to people, that might not say that the learners wants to be quiet or do not want to take part in discussions. When it comes to talented learners they even might have more to contribute to the discussion if they dare to speak out or if they would get the opportunity to speak in a discussion. The talented learners can also be twice exceptional, which makes it more complex and it can also affect the social skills. Educators need to be aware of the talented learners social skills to be able to to help out in different ways to include the talented learne**r**.

Even if the talented learner shows great skills in one or many ways the social skills might be for some, their achilles heel. Educators can make a great difference for talented learners. In this chapter you will get tools to help talented learners become more socially skilled and included in social situations. Let you be the one who makes the talented learner blossom in colors and let it not be gre**y**.

Ordinary school environment and classroom climate needs to be positive to be inclusive. Education in general also needs to be working towards social skills and social inclusion. But what are social skills and social inclusion? In the first subchapter the definition of social inclusion will be presented for yo**u**.

Talented learners and twice exceptional learners have very developed skills in some areas and in other areas they might be lacking. This makes it even harder for an educator to both handle and understand and even harder to make the school an inspiring, motivating and meaningful. The subchapter “Social inclusion of talented learners in the classroom” brings up the importance of having friends and classmates and make the classroom a learner friendly aren**a**.

Learners and educators are all individuals with different backgrounds, emotions and skills. You do not know about the talented learners background and how the morning was at home or on the bus to school. Talented learners may struggle with the social environment and you as an educator need to think beyond the dehavior of the learner and focus on how to support the learner to tackale ordinary social siuations. The chapter of the school climate focus on making positive relations between learners, talented learners and educators and to make the school climate positiv**e**.

Next subchapter is about how to make efficient school management tuned to promoting talent. Education is more then supporting talented learners producing good grades and marks, educator needs to support talented learners to become motivated, self confident, respected and involved in their own learning process. This equires schools to create a positive learning environment with the support and engagement from an educator or adul**t**.

Educators needs to continuously develop and be humble about their knowledge. Talented learners can put teachers in the situation that they need to take the role as a mentor instead of being the teacher who teach, you need to guide. As a mentor and guide the skills needs to be social and inclusive for the talente**d**.

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Definition of social inclusion

***Moana Widell**, M.A. Upper Secondary Education: focusing on Computer Science, Programming and Business Studies. B.A. in Informatics, specialization in Systems Architecture. Internationalisation Strategist at AcadeMedia's Theoretical Upper Secondary Schools. AcadeMedia, Stockholm, Sweden.*

Social inclusion is more about the process of making all participants able to take part and participate in the society for all individuals, especially those who are disadvantaged or marginalized. It involves ensuring that everyone, regardless of their background, identity or circumstances, has equal opportunities to participate fully in social, economic, political and cultural life. Social inclusion means removing barriers and creating conditions where all people feel valued, respected and able to contribute meaningfully to their communities. But what are social skills and social inclusion?

> *Social inclusion is a process of removing barriers and ensuring that all individuals - regardless of background or ability - can participate fully, be recognized, and contribute meaningfully within social and educational contexts (Rawal, 2008; Silver, 2015).*

In the 2025 Erasmus+ Programme Guide, "social inclusion" is a central priority aimed at ensuring equal access, participation and opportunities for individuals and organisations across the EU. The guide does not provide a formal definition of "social inclusion," it points out the importance of working towards equal opportunities, access, inclusion, diversity and fairness in all work we do as educators and decision makers.

In Erasmus+ program guide 2025 they promote participants to take part in the program that belongs to the category "fewer opportunities". Fewer opportunities refer to different categories that may limit their participation in the program. There are eight categories of fewer opportunities according to the Erasmus+ guidelines:

1. Disability - People with physical, mental, intellectual or sensory disabilities.
2. Health problems - Long-term illnesses, mental health issues or other serious health conditions.
3. Educational difficulties - For example, low educational attainment, learning difficulties or school dropouts.
4. Cultural differences - People from minority groups, refugees, migrants or those facing language barriers.
5. Social barriers - People from disadvantaged social backgrounds such as socioeconomic or unstable family situations.
6. Economic barriers - Low-income participants or those facing financial difficulties that limit their ability to participate in Erasmus+ projects and mobilities.
7. Geographical barriers - People living in rural areas or regions with limited infrastructure and access to education or employment.
8. Discrimination - Individuals at risk of discrimination based on gender, age, ethnicity, religion, sexual orientation or other factors that can cause discrimination.

Erasmus+ provides additional support and funding to ensure that these groups have the opportunity to participate in the program. Erasmus+ wants all to work towards social inclusion by inclusive environments that promote equity and equal opportunities for all participants. Therefore, we as educators around the EU

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also need to be aware of who among our talented learners might have fewer opportunities and support them to take part and work inclusively with these learners.

Organisations participating in Erasmus+ are encouraged to design projects and activities that are inclusive and accessible to a diverse range of participants. This involves implementing mechanisms and allocating resources to support inclusivity, ensuring that initiatives are tailored to address the specific needs of underrepresented or disadvantaged groups. The Erasmus+ KA2 project of Educating Talents is in itself a project aiming just for a disadvantaged group, talented learners. They tend to sit idle in class and have already done their tasks, being bored out and eventually maybe drop out of school because the education is not supporting them to develop and learn more. Every learner, meaning also talented learners, has the right to reach their full potential.

Social inclusion of talented learners in the classroom

***Dr. Ulrike Moser**, Talente Upper Austria, Specialist in Gifted Education*

Social inclusion is essential for every single learner in any form of education. For a long time social inclusion referred to children with special needs, as it was believed that talented learners would make their way anyway, not considering the fact that they might have problems of feeling integrated, due to their outstanding potential.

Although there are a few schools just for the gifted, the majority of schools is attended by learners with a wide range of abilities. It is a great challenge for the educators to respond to the different needs of the learners, so that each learner feels comfortable and integrated.

Most important is the awareness among educators that learners, who have higher-than-average intelligence, talent or potential should on the one hand be treated in the same way as all the other learners, on the other hand they often need other and more difficult tasks to avoid boredom. (*See chapter "Motivation through individualization."*) They need praise and recognition in the same way as averagely gifted learners do. Sometimes their biggest aspiration is to be accepted by their classmates and to have friends.

So, one of the main tasks of the school and the educator is to create a learner-friendly environment, in which each learner has the opportunity to develop well, in which learners can sometimes work on their own projects and at their own personal pace. In this way, the mutual understanding among learners is trained and social inclusion becomes self-evident.

School climate and educators' attitudes

***Dubois Audrey**, Teacher and Collaborator at Pôle territorial WBE Hainaut Centre*

According to the results of the Program for International Learner Assessment (PISA), the 2003 report, which for the first time looked at psychological factors such as learner motivation, self-image, learning strategies, enjoyment of school, anxiety levels and sense of belonging, confirmed several shortcomings in our education system.

An increase in learning difficulties, behavioural and relational problems, lack of motivation at school, stress, anxiety and aggression masking a feeling of failure and exclusion are increasingly present among our

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young people. Combined with family and social factors, these situations can trigger risky behaviour in adolescence, school dropout, bullying and exclusion from school.

We now know that the classroom climate is closely linked to the academic success of learners. When it comes to creating a positive classroom climate, we know that an educator's attitude towards learners who behave in a "difficult" way is crucial. "Appropriate" educators and the pedagogies they use are essential to maintaining a good classroom climate. According to Connac (2022), cooperative teaching methods help to prevent conflict in the classroom and contribute to the development of the psychosocial skills that educators are so keen to see in their learners. In the classroom, these skills are reflected in good self-control, good communication, open- mindedness, autonomy, respect for oneself and others, the ability to solve problems, sense of responsibility, etc. Cooperative learning involves getting learners to work in groups and creating synergy between them. It is beneficial for academic performance, the development of social skills and self-esteem (*Abrami et al., 1996*), as well as memorization.

Learners are empowered in that each member of the group makes his or her own contribution to achieving the objective (*Baudrit, 2005*). A positive interdependence is created within the group: learners are more likely to achieve a goal when one of the group members has achieved it, unlike in a competitive structure (*Abrami et al., 1996*).

The so-called cooperative class is a place where the values of mutual aid between learners in learning are encouraged. However, this is not self-evident. It is not enough to get learners to work together as a group. As with other knowledge, learners need to be taught to work in groups: "this requires work and involvement that correspond to a real project that needs to be announced to the learners so that they can share it with the teacher" (*DeVecchi, 2006*). The aim is to make learners aware of the benefits of working in groups.

Before starting to develop collaborative practices in the classroom, it is essential to prepare the learners by creating good group cohesion. This group cohesion can be prepared by playing cohesion games. To do this, it is important to understand the emotional dynamics at play in a group and to learn how to regulate them.

Teaching is by its very nature an "emotional practice". While so-called "positive" emotions, such as interest, curiosity and joy, are the basis of motivation and the development of a sense of security are essential for building an effective community of learners, so-called "negative" emotions, such as sadness, fear and anger, can conversely inhibit the learning process. This is especially true for talented learners.

A classroom is a skilful cocktail of interpersonal emotional experiences (within the educator and each learner) and learner interpersonal experiences (between learners, between the educator and each learner, and as a social experience of collective emotion).

Educators need to adopt an attitude of full awareness of their emotional experiences, so that they can recognise, understand and regulate them effectively, to adopt an appropriate stance towards young people and avoid amplifying so-called inappropriate behaviour.

To prevent conflict, it is essential to put ourselves in the other person's shoes, to understand that we have different needs, to know how to hear and communicate them in a healthy way and to respect them is essential if we are to maintain quality relationships with our peers. Non-Violent Communication (NVC) is a communication method formalized by Rosenberg (2016). Enter into a relationship with another person is to communicate. The ability to listen is therefore the key to better mutual understanding, in a neutral posture. This neutral posture is very complicated to adopt, because it requires you to set yourself at ground zero, i.e. to forget everything you know, everything you think you know, in order to really listen to the other person, as if it were the first time you had this information. Avoid "Yes, but..." answers. Creating a climate of trust and adopting "*empathic, congruent, benevolent*" postures*, accompanied by unconditional positive consideration for the other person*, is essential in this process (a posture presented in Rogerian theory). It requires a lot of

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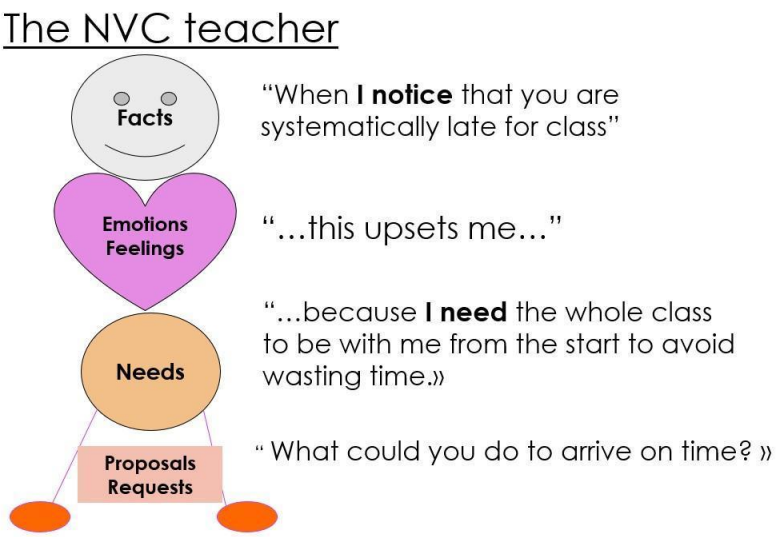
self-questioning and work on oneself. Being congruent means agreeing with yourself: the alignment between what you think, what you say and what you do. This quality, along with the notion of justice, is greatly appreciated by our learners and educators, and even more so by young HPs.

NVC reduces violence and encourages cooperation. Children trained in NVC blossom, express their emotions and wishes, understand themselves and others better, and know how to say no to violence. They no longer feel the need to be the strongest, to devalue others, but become attentive to and protective of those who are being humiliated. They enjoy getting on with each other and cooperating. Happy, stress-free children are motivated and curious. They want to learn, to understand, to be enterprising and become creative.

Here are the 4 stages of NVC, or what we call the 'NVC man' (*Rosenberg, 2016*).

1. **Observation (O):** describe the situation without judging: start from the facts, be objective.
2. **Sentiment (S):** express your emotions and the behaviours that result from them using "I". Never use the "you that kills".
3. **Need (B):** identify the need associated with this emotion and express it (an unsatisfied need = an unpleasant emotion),
4. **Request (D):** What solutions can be found to a problem? Make a request that meets the following criteria: feasible, concrete, precise and positively formulated.



To achieve this, it is essential for educators and learners to understand the link between needs, emotions and the behaviours that result from them. Here is a table to help you understand the link between basic emotions and learners' needs.

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Emotion	Origin	Needs	Useful answers
Fear	Danger, insecurity	Safety	Protection, clarification
Sadness	Loss, lack	Relationship, belonging	Empathy, connection, consolation
Anger	Disrespect, physical and/or psychological damage, powerlessness	Respect, change	Listening, reparation and action
Joy	State of satisfaction, well-being	Sharing joy	Participation, humour
Guilt	Fault, loss of pride	Repair, improve	Encourage change

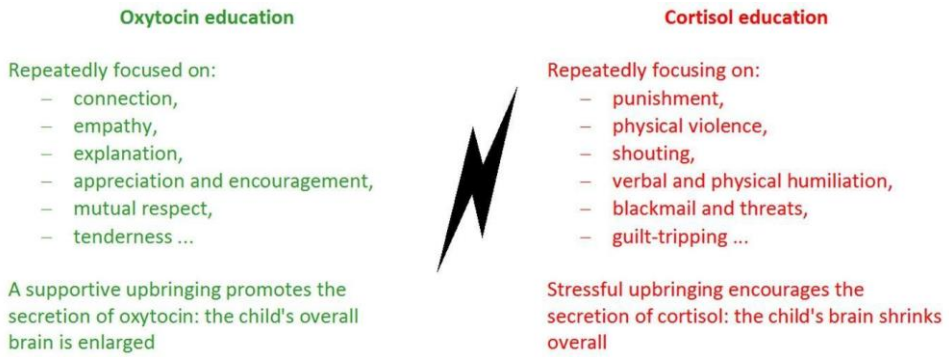
The identification grid, based on the principle of positive discipline, is a tool for clarifying certain needs and behaviour of learners.

We know that motivational dynamics are influenced by many external factors. The model developed by Viau (2009), a lecturer and researcher in the Department of Education at the Sherbrooke University, groups these different factors into 4 distinct categories: the learner's personal life (e.g. family), society (e.g. culture, values), the school (e.g. rules, timetables) and the classroom (e.g. a teaching activity).

Educators have little control over certain factors, such as those relating to the learner's personal life, society or the school infrastructure itself. However, before starting a teaching activity, the educator can help to regulate the learner's emotions, which are so essential before they start learning. For example, they can set up a preventive, regulated talking circle to help young people vent their frustrations, or they can use a technique known as the "emotional regulation", such as practising mindfulness to refocus the learner's attention in the present moment.

Neuroscience tells us that too much stress can block learning in the classroom. The orbitofrontal cortex (OFC), the part of the prefrontal cortex that controls our emotions, enables learners to manage their emotions and to engage in learning, thus developing harmonious social relationships with those around them. This part of the brain does not mature until the age of 25 and under certain conditions.

When there is positive, benevolent, supportive feedback... from the people around the child, when the adult respects the young person and explains things calmly without getting upset, then he or she is helping the OFC to mature properly.



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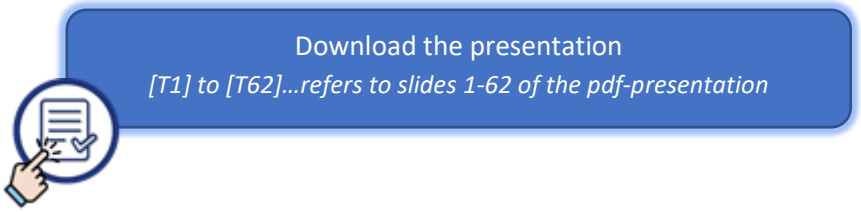
Before the age of 25, the OFC is immature. It is extremely sensitive to the hormones released by stress. When young people are under the influence of stress hormones (adrenaline, noradrenaline), they are unable to control their emotions like adults. It is not that they do not want to, it's that they don't know. When adults do not understand children's behaviour and react by getting angry, punishing, humiliating or hitting them, they delay the maturation of the OFC and the age of "reason". Abnormal behaviour at that age will persist. The child can neither manage strong emotions nor empathise with others.

There are three types of stress: attack, shock and flight. For each type of stress, the educator can adopt a posture that helps to reassure the learner who needs security.

Efficient school management tuned to promoting talent

***Dr. Günter Schmid**, external expert; founder of the Sir Karl Popper School for talented learners in Vienna, Austria*



When you look at the title I have chosen for my presentation, you may wonder: Isn't promoting talent something that all schools are intent on anyway? Do we really need specific management strategies to achieve what Gabriele Weigand in her bestseller „Schule der Person" describes as „Existenzberechtigung", „the basic justification for schools"? A definition that seems to be reinforced by the second quotation, which is taken from one of my own books: namely, that what is commonly referred to in English as „gifted education" – why I am not using this term here I shall explain in a minute - is indeed the most obvious objective for any school to strive for. And if you ask the average teacher – at least in this country -, they will assure you that, of course, this is precisely what they are doing in their everyday teaching routine anyway.

But if you look at this second quotation a little more closely, you will notice that, while I am emphasizing that **any** teacher CAN and, in fact, SHOULD do it – promote talent, that is – I also insist on it depending on a „very specific **pedagogical disposition**" („**pädagogische Haltung**" in German); what makes me put it this way is that I suspect that this is not necessarily the kind of approach to teaching that comes naturally to all teachers, sometimes not even to the most well intentioned. I realize that, when saying this, I must be on my guard because to a teacher who is doing his best every day a statement like this may sound a bit condescending. But give me a few more minutes, and I will try to make you see, and agree with me, **[T2]** that a surprising number of teachers, even some of the very best ones – not to speak of headmasters and school authorities – are inclined towards a rather reductionist view of what we call „Begabungsförderung" in German. There can, of course, be no doubt that our teaching should always be „promoting" in some way; everybody will agree here. But let us examine this pedagogical imperative a little more closely: Who or what exactly is it that we should promote? Is it just the 3% minority of highly gifted learners, as the widely used term „gifted education" or the German word „Begab**ten**förderung" suggest? Or is it talent in a more general sense: talent that in one way or another is present – though often undiscovered - in every human being? Should we try to establish specialized schools reserved for this minority group of highly gifted youngsters only? Or had we better focus out attention

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on talent in a broader sense: talent that is tob e found in all schools, even if it is often hidden below the surface and has not yet been identified?

[T2/1] What is commonly looked upon – I would say, mistakenly - as evidence of talent is either some glamorous artefact produced by a learner, such as a test with a top score or an excellently written paper or an impressive performance of some kind, like a prize won in a competition. In other words, what we call „Leistung“ in German, what a learner „achieves“, is narrowed down to a palpable product that can be measured. **[T2/2]** It is only logical, in this case, and makes sense for the teacher to try and think of means which are apt to motivate learners to try hard and produce ever better results, and to „seduce“ them with a promise of desirable awards, such as good marks, or some sort of prize!

But is providing facilities and inventing tasks which (we hope) may be conducive to enhanced achievement really „promoting talent“? **[T2/3]** Isn't it rather promoting what the learner **produces**, his output, a **product**, not his inherent talent? Does this type of promotion have any effect on the producer as a person?

[T3] Whenever we are to judge what a specific educational method does to learners, we should ask three basic questions: **[T3/1]** What exactly does it focus on? For what purpose / What is it aiming at? And how does it try to achieve what it is aiming at?

Let us apply this test to what I would call the prevalent, „classical“ idea of promotion: the one that focusses on output as the object of promotion. **[T3/2]** What the teacher is aiming at in this case is for learners to produce the best possible results in order to get the best possible grades – **[T3/3]** which, looking at it more closely, turns out to be a purely quantitative criterion. **[T3/4]** But what about the qualitative aspect – not so much of the product, but of the learner's performance? Is he/she in any way personally involved in the resulting product, **[T3/5]** or is his output just a (however competent) response to a task set by an **external authority**? **[T3/6]** If this were the case, this would indeed be a rather short-sighted view of „promotion“. **[T4]** Focussing on output as the sole criterion of assessment means reducing a learner's performance to his ability to recall what is considered to be useful knowledge, knowledge that has been carefully rehearsed and that he has been trained to reproduce on demand – an ability that may well appeal to the learner because in addition to the award it may gain him it is likely to prove beneficial to his reputation. **[T4/1]** But it is an entirely monodimensional way of looking at things. It may be evidence of a learner‘s diligence and ambition, but it does not really have anything to do with talent. **[T4/2]** It simply proves that the learner is a well functioning unit within a set system – a bit like a well programmed machine.

[T4/3] If what we are thus promoting is just an isolated, impersonal product, what we have to do, obviously, is to widen our horizon and broaden the basis of our assessment of what we interpret as a person's achievment. **[T5]** A first step is to include at least the **learning environment**, i.e., to judge individual performances against the background of external conditions. Let me illustrate this **[T5/1]** by a comparison with ski jumping. **[T5/2]** Suppose someone, having informed you that some anonymous person has just done a 100 meter jump, asks you what you think of this performance. Could you answer this question? **[T5/3]** I don't think you could, unless you find out a few details about the **external conditions** prevalent at the moment the jump was carried out.

What are these external conditions? **[T5/4]** Obviously, some of them form part of the system and therefore cannot be influenced or changed, while others depend on circumstantial conditions that can vary from one moment to another, like the weather. **[T5/5]** Depending on those external conditions, the 100 meter jump may have been either an excellent performance, or just average or even a disappointing flop. **[T5/6]** To

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be able to judge the performance competently we need to know about the situational conditions, and our assessment must be commensurate with them.

In a school context this is what we mean by the learning environment, which – other than the weather in the ski-jumping competition - can – and should! – be influenced by those in charge. **[F6]** If teachers want to actively improve learner output without waiting and hoping for things to happen by themselves (owing to conditions outside their own influence like pupils' diligence, or ambitions, or greed for good marks), **[T6/1]** their primary effort can only be to improve their own input.

[T6/2] But are teachers really in a position to influence **all** aspects of the learning environment? Didn't we say a little while ago that there were also certain system-based conditions which are unalterable, like the jumping hill in our example from ski jumping? **[T6/3]** Luckily, in our pedagogical context, many of these system-based conditions can at least be modified, usually by a subsequent addition of devices that are not originally included in the system. **[T6/4]** But this is a matter of school-development. And school-development, as opposed to the other branch of possible intervention in the learning environment, viz. teacher development, is more or less reserved for headmasters – although, mind you, there are schools where the headmaster is kind of asleep, and a small pressure group of motivated teachers may well succeed in initiating a process of school development, which has a chance to succeed as long as the headmaster confines himself at least to benevolent inactivity. However, this is a very tough job and takes a lot of willpower and determination on the part of such a minority group of heroes and heroines. My advice, therefore, is rather to try and convince the headmaster that it will also benefit his own reputation as a great school developer.

[T6/5] One example of such an add-on instrument that is an attractive asset to have to show off in the official school programme for one thing and that can serve as a substantial improvement of the learners' learning environment for another is the **revolving doors model**. **[T7]** It can help to spare learners tediousness, which is inevitably destructive to their motivation, on the one hand, and it can avoid wasting their time on the other. **[T7/1]** If e.g. a pupil is over-competent in a certain subject, such as a foreign language which he/she has learned in natural surroundings like from a native speaker parent or in a foreign language primary school like the Lycée francais in Vienna, he/she can be allowed, or even encouraged, to attend classes at a higher level in this one subject. **[T7/2]** Provided that this option has been explicitly included as a special regulation in the official school programme, such a situation can even lead to „jumping of classes" – of course only in the one subject concerned.

[T7/3] An (authentic) example of the second type mentioned above would be the case of a pupil who is so obviously over-qualified in a specific subject that to force him/her to attend all classes of that subject (in my example this would have meant five Latin lessons every week for a highly gifted 15-year-old girl) simply does not make sense. In the case I am talking about I agreed with the girl that for a period of two months she would only attend four instead of five weekly classes and spend the time thus saved on developing a project of her own choice, which she was to present to her classmates in a PowerPoint format.

[T7/4] In this way the revolving doors model can serve as a very useful and learner-friendly instrument of either acceleration or enrichment.

[T8] If you look at this overview of what output-oriented promotion of talent with teacher intervention can achieve, you can see that, while there are clearly some obvious positive effects and the knowledge thus

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acquired is definitely a solid basis to be relied on and built upon, **[T8/1]** there is also one limitation: unless we develop some really „enriching“ instruments like the above mentioned revolving doors model, the instruments we have at our disposal are more or less restricted to the surface level of organisational structures, largely determined by regulations of the existing system, and can only influence the learners‘ learning process from outside. **[T8/2]** However, there is one open question that remains unanswered: Where and how does the learner himself, the learner as a human being, as a person, come in? **[T9]** Is this really the end of the road? **[T9/1]** Does it suffice to concentrate on products? **[T9/2]** Shouldn‘t we also pay some attention to the **processes**, to the individual circumstances in which these products are created, to the **learners‘ personal contributions**? **[T10]** Shouldn‘t we widen our horizon even further to include the learners‘ perspective?

[T10/1] For what is by far more relevant for both motivation and the quality of the resulting products than facilities provided by the school and the methodological quality of teacher input is **[T10/2]** how learners (who are human beings after all, apt to react emotionally) **experience** the learning process. **[T10/3]** If they are bored by what they think of as redundancies, this is bound to cause negative emotions; and if they suffer from what feels like enforced drill, this will be detrimental to the personal relationship we may have succeeded in establishing. In both cases teachers will be disappointed at what seems to be the ineffectiveness of their teaching, and pupils will feel that their time is being wasted.

[T10/4] There is one golden rule for learning to be effective: seen from the learners‘ point of view, it must be a pleasurable experience.

[T11] What can we do to make learning a pleasurable experience for learners? I found a good answer to this challenging question in a little poem that was pinned on a wall in Armin Hackl’s office in Würzburg: **[T11/1,2]**: This is really a kind of pun, playing on the German modal verbs „können“ in its double meaning of being able to and being allowed to, „dürfen“ (being allowed to), „sollen“ (being expected to) and “müssen“ (being obliged to). The message is unmistakable: **[T11/3]**: Please, dear teachers, do respect our personal preferences and let us determine our own learning processes, grant us **autonomous learning**!

[T12] As this may sound a bit like a hollow phrase, let us examine more closely what autonomous learning means and what we can do to give our learners this sense of self-determination. To put it in general terms: **[T12/1]** It is not having knowledge imparted by some external authority, in the role of a passive receiver who is expected simply to reproduce on demand what he has previously been taught; rather, it is the right to actively construct one’s own knowledge so as to make it develop into practical competences that are accessible at will. **[T12/2]** More specifically, it means organising one’s own learning process with regard to the amount of time and energy one is willing to invest, to special fields one wishes to focus on, to preferred learning styles etc. **[T12/3]** But at the same time this involves accepting **responsibility** for one’s preferences and choices, so that one may be respected for the values one has thus opted for and recognized as a person to be relied on **[T12/4]** as an equal and active member of the „system“ and who is therefore worthy of full participation in matters of school organisation, teaching practices and criteria of assessment. Two very effective examples of this latter form of learner autonomy are contracting and feedback.

Contracting is what the name suggests: a written contract between a teacher and a group of learners (or individual learners, in the case of what we then call „individual contracting“) which is negotiated in and outside regular classes in the first week of a school-year or of a semester and is then stuck to, and can always be referred to, by both parties. Here is an example of such a contract: **[T13]** …. Two decades of Popper-school-

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experience have proved that such contracts guarantee a substantial improvement of the classroom atmosphere.

[T14] Feedback must be institutionalised and part of the system, so that learners can rely on it as something they are entitled to and which is not depending on a teacher‘ s good will; and the teacher, in turn, will not feel unduly criticized but welcome it as a gift, which gives him a chance to learn a little more about himself and thus develop as a teacher. There should be both oral and written forms of feedback. **[T14/1]** Mutual oral feedback should be an informal practice carried out during classes at regular intervals, with the teacher first giving each pupil a short overview of how he has experienced him/her as a person in the past weeks and then asking the class what messages they would like to communicate to him. If the classroom atmosphere is a friendly one grounded on good partnership – as it should be after a phase of well planned contracting – and if the personal relationship between the teacher and his pupils is a cooperative one and based on mutual respect, this will prove very beneficial for both parties. **[T14/2]** Written feedback by the pupils to the teacher should be anonymous, to give pupils a chance to voice their genuine and honest feelings. **[T14/3]** For some this may not be an easy task, therefore it should be carefully introduced and rehearsed by exercises which do not involve the teacher, like short periods of written self-reflection during classes, **[T14/4]** in which pupils can by and by develop a sense of how to formulate fair and inoffensive feedback, and, on the other hand, how to accept and respond to feedback, in case they have volunteered to share and exchange their self-reflection with a partner of their choice.

Contracting and feedback are important contributions to equipping learners with a **sense of being taken seriously**, which is the single most important aspect of autonomous learning - and thus of a more personalised form of promotion. **[T15]** From the teacher’s point of view, it is nothing less than a **change of perspective**: rather than wondering – as he is wont to do – **[T15/1]** what **he** can possibly offer his learners in the way of content, what methods he could possibly employ to improve their learning process (as the objects of his teaching), the teacher should ask himself **[T15/2]** how learners (as the subjects of their own learning) should preferably **experience** this learning process. **[T16]** At the same time he should shift his personal focus from **[T16/1]** what he thinks he has to do (in order not to offend against the rigid regulations and organisational structures of an impersonal system) to what he had better do in order not to hurt the learner’s feelings. **[T16/2]** For emotions based on personal relationships are THE key to successful learning.

[T17] We have thus made out a **second dimension** of a person’s achievement: **[T17/1]** starting from objective external criteria like a visible and measurable product **[T17/2]** and the situational conditions in which it is produced, to a more subjective assessment **[T17/3]** taking into account the performer’s personal constitution, which, **[T17/4]** in addition to physical aspects like age, sex and fitness, includes his individual potential. **[T17/5]** This is clearly a much broader and more representative view of achievement than the narrow confinement to measured quantities.

[T18] Let me illustrate this with the help of a diagram: A set system like a school has a certein capacitiy, which is defined by the facilities and conditions it provides. This is represented here by the square. **[T18/1]** Output is measured as a score on the vertical line. **[T18/2]** The horizontal line serves for marking the degree to which individual potentials are exploited. **[T18/3]** Individuals have different potentials, which may even reach beyond the capacity provided by the respective system. **[T18/4]** How much of this potential an idividual learner actually uses depends on his/her motivation. In the case of somebody who is not only highly gifted but happens to be extremely motivated as well, this may well go beyond the second dimension of the school’s

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capacity. Supposing his/her measurable score were to reach the top level on the vertical line as well (it is difficult - though not altogether impossible - to imagine a score higher than what the system has been designed to allow), this would be an extraordinary performance well outside and above any ordinary standards.

[T18/5] The area formed by the two marks on the vertical and the horizontal lines visualizes the respective individual achievement. In our example the learner's measured score is only half of what the school would theoretically allow for, and his individual potential is either only about 80% of what it could be (in this case he would be an average performer), or he does not fully exploit what potential he has (in case he is highly gifted). What we can gather about our learner from this diagram is that while his score is rather disappointing, the exploitation of his individual potential does not seem too bad (unless he is highly gifted).

What it also calls to our attention is that individual achievement obviously does not lend itself to measuring. **[T19]** In a situation like the one depicted in this diagram, it would be pedagogically at least questionable, if not couter-productive, to let oneself in for a comparison of the two performances. If A and B attend the same class, it means that they are offered identical facilities (which is symbolized by the vertical dimension). Supposing their individual potential is also identical, this would mean that at least the **individual** achievement of learner B is to be ranked above the one of learner A, because B has invested more of himself than A; and if we square the two areas, we will see that 56 wins over 45. And yet A will probably find himself confirmed by a better grade in the annual report, while B will be frustrated at finding his high personal commitment unrewarded. **[T19/1]** The pedagogical consequence of this unsatisfactory situation is that we have to think of an appropriate form of personal feedback in which we appreciate and honour the effort B has invested. In Sir-Karl-Popper-Schule it was common practice for each teacher to write a short personal letter to each of his pupils once in the middle of each term. If you are interested, I have a few authentic examples of my own, which, however, I did not bother to translate into English.

[T24]: If we measure learners' factual achievements against the background of their individual resources, or to be more precise, to the degree of exploitation of their respective individual potentials, we have a much better chance of doing them justice as human beings. And it would be wrong to think that individual potentials are a matter of intelligence only. In Sir-Karl-Popper-Schule, the kind of intelligence that can be measured in tests counted as only one among several resources, and not the most important one, for that matter. These two lists of individual resources may show you that below the surface there is a lot more to a person's intrinsic mental constitution than measurable qualities like intelligence. **[T24/1]** How many of these individual resources a learner uses and to what degree he is prepared to invest them tells us more about his personality, not only about what motivates him, but, one step further, about what he actively **wishes** to achieve, about his **volition**, to introduce the official technical term for this second dimension of achievement.

[T25] We have seen that in the first stage learning is instigated by **extrinsic motivation**: by the prospect of some kind of **reward** that is supplied from outside. Once learners are granted **self-determination** of their own learning process, this results in intrinsic motivation, i.e. the driving force no longer comes from outside but originates inside the learner. **[T25/1]** Now he strives for something for its own value, because his new **experience of autonomous learning** has made what was originally just motivation, i.e., passive acceptance of a task imposed on him with a view to the reward he can hope for, develop into an **active wish** to achieve a desired task, for which he is also prepared to accept **responsibility**. This requires **reflection** on the part of the learner and makes the learning process more efficient by increasing his self-competence – we are talking about **quality** here and not just about quantity.

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We can see that the addition of a second dimension to the idea of promoting talent is a substantial improvement on the classical, mono-dimensional approach in that, in addition to measuring isolated products, it tries to do justice to the learner as a person by applying **subjective** criteria as well. But does it really include the entire personality of the learner in all ist aspects? **[T26]** Didn't we say, a little while ago that, since they are dealing with human beings, and human beings are driven by emotions, teachers should also shift their focus from structures, content, and methods with which they confront these human beings to the the learners' emotions, to their **subjective learning experience**, to what it feels like being taught, to their **emotional** response? **[T26/1]** And didn't we also say that emotions are in fact THE key to learning? And that emotions are based on personal relationships, which, applied to a pedagogical context, have a lot to do with teachers' attitudes.

[T27] Including the learners' emotions in our pedagogical considerations is indeed a monumental step, which we may rightly call an „**anthropological revolution**". It reflects an entirely new pedagogical attitude on the part of teachers. For the first time learners are not only taken seriously as partners, but seen in their entire personal complexity. **[T27/1]** They are no longer looked upon as passive „objects" of teaching who are expected to reproduce knowledge or create products that are relevant to, and useful for, society. **[T27/2]** Their learning is fully acknowledged as their own **active effort** in the role of agents, or subjects of this effort, to organize their own lives. In G. Weigand's words, this makes them „**authors**" of their own lives. **[T27/3]** This broadened vision of learning and teaching as largely depending on emotions and human relationships between learners and teachers is a truly innovative pedagogical approach. It was first introduced by the German/Austrian/Swiss eVOCATIOn-group in the second decade of our century and named **person-orientation**. **[T28]** (See the two most important books published by this group.)

However, novel as this vision of learners' performances may be, something very similar was described as far back as 2000 years ago by St. Augustine in his „Confessions": **[T29]**.

This short paragraph, which is 2000 years old, looks like a summmary of the progress of educational concepts of the past 50 years and serves me as a basis for this overview of the multiple levels of motivation, as we have just described them: **[T30]**. The personal relationship, which a teacher can establish between himself and his class by granting them full partnership, opens up a third path to learning for the learner, where extrinsic and intrinsic factors of motivation, by and for an inanimate goal that is sually outside the human sphere, **[T30/1]** are supplemented by a personal factor: the motivation to reach the desired goal together with, in a spirit of partnership with, another human being. **[T30/2]** And this is a process which involves profoundly human aspects like values, personal features, and co-cognitive talents and cannot possibly do without reflection. **[T30/3]** Thus, this third path to learning is the one which does not only create impressive external products, but also ensures the learner's internal personal growth. **[T31]**: Teachers who neglect this partnership approach miss out on a unique opportunity.

[T32] In our diagram this three-dimensional view of what a learner achieves can be represented as a cube, where the third dimension marks the development of his personality, his personal growth. A comparison of learners A and B shows that measurable scores, visible products, can by no means be taken as reliable testimonials of a learner's inherent qualities as a person. Even the addition of a second dimension, which tells us something about his **efficiency**, leaves the picture incomplete. [**T33]**: Here is a picture of what we can know about a learner, applying a two-dimensional stance. **[T33/1]** It isn's until we include personal criteria like personality development and self-competence, **[T33/2]** which make up what we call **excellence,** that we can

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venture to pass a valid judgement on a person's genuine education, **[T33/3]** which, as we have seen in St. Augustine's text, comes as a result of a **personal learning experience**.

This, by the way, is why my friend Armin Hackl and I called our book „Erlebnis Bildung" **[T34]**.

[T35] We have now gone through a succession of three stages of how talent can be promoted, and we have seen that there is obviously a kind of hierarchy of how valuable the various results of learning are and how learners react to them. **[T35/1]** In this diagram we can see that the lowest level of achievement for a learner is to acquire what we might call **passive knowledge**, which is something that can only be reproduced when called for. It takes several steps for it to be **activated** without an impulse from ouside (**ability**) or to be consciously applied to new contexts (**transfer**). In the latter case, very much will depend on how much the learner is prepared to invest of himself. **[T35/2]** In the case of a substantial exploitation of his individual potential he can be quite satisfied with himself and will be respected as an **efficient** person. **[T35/3]** But if we look at the pyramid, there is obviously something missing. **[T35/4]** Would we automatically think of an efficient person as an **educated** person in the above defined sense of excellence? **[T36]**: We have heard that the type of motivation that is grounded on partnership goes along with a lot of **reflection,** which, in turn, is bound to lead to increased **self-competence** and thus to personal growth: **[T36/1]** from what one has once been in a more or less **static** position to what one now has a chance to **become**, to make of oneself. For this top level of personal achievement Victor Müller-Oppliger has coined the untranslatable German term „**Eigen-Sinn**".

[T37]: It describes the personal significance for the learner himself of what he has learned, i.e. **[T37/1]** the competence to ……. (see text on transparency **T37/2**)

[T38]: To sum up: Altogether there are three concepts and levels of promoting talent: **[T38/1]** Seen through the eyes of a teacher, who is keen above all to optimize the results produced by pupils, the school can **provide learning opportunities / tasks** that are likely to motivate learners to do their best to get some sort of reward, usually in the form of good grades. This is a matter of school development, which is above all the headmaster's domain, and of teacher development**. [T38/2]** Changing sides from the teacher's to the learner's point of view, getting his own individual talent promoted means experiencing a sense of „**freedom**", i.e. being entitled, or even invited, to **self-determined** learning. This is what is generally associated with the term „individualisation". **[T38/3]** Looked upon from outside, as it were from an objective point of view, promoting talent has to do with **values,** either conveyed to or realized by the learner, which are of **personal significance** to himself in that they increase his self-competence and make him grow as a person. It is really promotion of **excellence**, which goes by the name of personalisation.

[T39] Here is an overview of the three concepts, which may help us to compare them at a glance. …. It is fairly obvious that the third string in this overview is the one to be ultimately aimed at.

But now let us turn to the **teacher**. What does all this mean to him? As we can see, he finds himself confronted with a choice among three different courses of action, none of which excludes the other ones, as they can very well, and in fact SHOULD be used in combination. **[T40]** Here is an overview of the teacher's dilemma, as we have described it. **[T40/1]** For one thing, he can concentrate on the **output** created by his learners and try, by all means, to elicit the best possible results. **[T40/2]** If, on the other hand, it also matters to him how his learners **feel** while creating these products, whether they are applying themselves to the task with a sense of dedication or find what they are made to do laborious, he will try hard to improve the quality of his own **input**, by working on his teaching skills and and trying to think of ever better methods to motivate

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his learners. **[T40/3]** This is clearly a very didactic approach, while I would call the former, not entirley without a sense of deprecation, a „PISA-approach“. **[T40/4]** The third and most advanced option for the teacher is to see each one of his pupils as what he/she is: a unique personality in his/her own right, with whom it is worth interacting and building up a personal relationship to act as a guide in this process of human growth. **[T41]** Of course, this is not an altogether easy attitude for teachers to mainttain, for it means having to get over two traditional beliefs that are both deeply ingrained in many teachers‘ minds **[T41/1]** and obstructive to a broadened vision of learners‘ internal constitution: **[T41/2]** the importance of the external usefulness of learners‘ results in a social context **[T41/3]** and the precedence of methodology over human relationships.

[T42] To get to this ultimate peak, teachers have do go through a progressive development, starting from a teacher-centered question like (see , which focusses on **measurable achievements** initiated by **external impulses** from outside, **[T43]** via a change of perspective, which centers on the learner’s learning experience and his emotional response, **[T43/1]** first with a view to maximum output (which is a value outside the learner’s personal interest) and then, **[T44]** in a shift of focus to higher levels of achievement, viz. to maximum exploitation of the learner’s individual potential **[T45]** to ultimate personalisation, which is manifested in a spirit of partnership and a personal teacher-learner relationship. **[T45/1]** The latter two steps reflect the learner’s progress from efficiency to **excellence,** or **human competence**. **[T46]** This is characterized by the following personal qualities: (… see transparency) **[T46/1]** G. Weigand sums it up by calling it [… see transparency **T46/2**].

[T47] By way of repetition and to put it in a nutshell, here is the development a teacher who aspires to get to the very peak of the „art“ of prmoting talent has to go through: **[T47/1]** His first step must be a change of perspective, which appreciates the learner as the subject of his own learning and thus as the „main character“ in the process. **[T47/2]** This change of perspective must go hand in hand with a shift of focus: from unalterable structures imposed from outside, to the learners as **human beings** who are driven by **emotions**, **[T47/3]** and, ultimately, from what useful service they can do to society to what they can do for their own personal growth.

[T48] This chart may help to make what I would like to see as the most desirable form of teachers‘ progress easier to survey: from a content-focussed to a person-focussed approach to teaching.

Can you remember the diagram about the hierarchy of learner achievements I showed you a little while ago? **[T49 (=T36)]** I would now like to look at this same pyramid from the teacher‘s angle and analyse how he/she experiences these various stages of learner-learning. **[T50]** You can see that on the two lowest levels, which focus on learners‘ (passive) knowledge and (active) ability respectively, to reproduce answers, or, as the case may be, create products, the teacher is focussed on his own input (content, materials, methods etc.), the quality of which he can enhance by a well targeted system of differentiation. At the efficiency level, the learner becomes the central object of promotion who is granted the right to autonomous learning, self-determination and participation. But he is still seen as part of the system. It isn’s until we get to the top of the pyramid, the level of excellence, that the learner is really taken seriously as a person for his own sake, not just as an individual part of the system, and human relationships and values come into play to help him grow as a personality.

As I see it, it should be a teacher‘s vocation to do all he can to guide all his pupils – not just the highly gifted ones! – as far up this pyramid as possible, preferably to the very top. But of course this takes a lot of

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teacher development. **[T51]** Here is a list of some of the most important requirements for teachers to establish what one might call a new „pedagogical culture“ in their school: … (see transparency).

[T52] This may sound like a very challenging list, but in actual fact it isn't really all that demanding. [**T52/1]** For a teacher who is willing to inform himself, to volunteer for some in-service-training and to accept empirical and scientific findings he is confronted with, all it takes is to have his awareness raised and be sensitized to novel patterns of thought – preferably by his own headmaster – and to sit back and start reflecting. **[T52/2]** If there is what I just called „pedagogical culture“ a little while ago, all the important key conclusions are bound to come naturally.

Let me sum up: **[T53]** What I have insisted on calling „promotion of talents“ all along is by no means the same thing as „gifted education“**:** it is by far more. It is not a special treatment reserved for a minority group of highly gifted individuals, but what I would call a natural right of **all** learners: the right to be assisted in the process of developing their own personalities, in a spirit of partnership by „teacher-guides“ who focus on human values rather than on quantity, **[T53/1]** who are open-minded enough, not only to allow, but even to **encourage** their pupils to raise ever new questions and thus to discover and explore ever new fields on a trial&error basis and broaden their (and their teachers') horizon. **[T53/2]** What this means for teachers on the one hand and learners on the other you can seen in these two boxes.

[T54] Here is what I hope can serve as an enlightening comparison of the widespread, traditional view of promoting talent and the new approach developed by the eVOCATIOn group as it is practiced, e.g., in Sir-Karl-Popper-Schule: …..

[T55] To conclude: How is such a value-based pedagogical culture organised? You can see that there are four groups that have a more or less equal share in this culture. Each of these groups has its own, specific responsibilities, but they all communicate with one another in a spirit of openness and transparency. **[T55/1]** This all works on the basis of a shared „pedagogical attitude“, **[T55/2]** the linking element being a prevailing sense of **partnership**.

[T56] Let me finally comment very briefly on the situation in which the individual learner finds himself. Like the teachers, who have to make up their minds about which of the possible courses of action to follow, the learner is faced with a similar dilemma: he has to decide about his priorities. **[T56/1]** If **good grades** are what he is aiming at in the first place, **[T56/2]** he will have to concentrate on „collecting“ as much knowledge as possible. This is, of course, a very passive stance, which contents itself with having knowledge imparted for the purpose of **reproduction**. **[T56/3]** A more mature attitude would be to strive for the competence to **actively apply** what knowledge he has acquired. **[T56/4]** As opposed to the first option, this would at least no longer pay tribute to the traditional concept of output-orientation. **[T56/5]** The wisest decision for the learner to take would be to concentrate on what he can learn to help him **grow as a person**, **[T56/6]** because this would mean a preference of **quality** over quantity **[T56/7]** and mark the difference between **genuine education** and mere trainig by drill&practice.

Which of these options learners will choose dependes very much on the general atmosphere prevalent in a school. **[T57]** In ir-Karl-Popper-Schule, an external evaluation of what pupils experience as the main conditions of successful learning produced the following results. **[T57/1]** I will explain what KoSo stands for in a minute. The „school as a learning institution, un-freezing“ refers to the permanent search for new solutions

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for what in the learners's eyes are still unsatisfactory situations. **[T58]** KoSo stands for … (see transparency) and is a compulsory subjects in grades 5 and 6 (i.e. for 14- and 15-year-olds) It is extremely popular with learners and is decribed by the teacher who invented it in the following way: … (see transparency).

An academic evaluation oft he Talenta School in Bale 10 years later produced more or less identical results.

Let me sum up: Therer are three categories for learners to experience promotion: **[T60]**

But more than from external academic evaluations we can learn from pupils themselves, when they are asked to formulate and write down their personal feelings. Here is a translation of such a document written by a 17-year-old girl: **[T61]**

[T62] Here is a shortened summary of how SKP interprets the concept of personalisation.

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Chapter 4: Strategies to improve awareness of blended teaching resources addressing the digital transformation

Rodrigue Collard, *techno-pedagogical trainer and e-learning manager at Wallonie-Bruxelles-Enseignement*
Sabine Haot*, Project manager at Wallonie-Bruxelles-Enseignement*

In recent years, digital transformation has fundamentally reshaped the educational landscape across Europe. Classrooms are no longer confined to physical spaces, and learning is no longer restricted to rigid schedules. This evolution offers new and exciting possibilities to support all learners, particularly talented and twice-exceptional learners who often require more personalised, flexible, and creative learning environments to truly thrive. While digital tools and blended methodologies are increasingly present in schools, their potential remains underutilised, often due to a lack of awareness, confidence, or pedagogical integration strategies among educators.

Throughout the earlier chapters of this eHandbook, we have examined the importance of recognising talent, selecting pedagogical models adapted to learners' needs or fostering social inclusion. These foundations highlight a recurring theme: that every talented learner is unique and deserves an environment where they can explore, be challenged, and develop their full potential. Digital learning environments, when thoughtfully designed and implemented, can provide this space.

Blended learning is more than just a mix of online and in-person instruction. It is a mindset that values flexibility, autonomy, and learner-centred approaches. For talented learners, this means the possibility to explore topics in greater depth, at their own pace, with access to a broad range of resources and tools. It also means engaging with problems that are open-ended, interdisciplinary, and connected to real-world issues,something digital tools are particularly suited to support.

However, to make this vision a reality, educators must first become aware of the possibilities offered by digital transformation. They need time, support, and training to explore new platforms, test new methods, and develop confidence in using digital resources in pedagogically meaningful ways.

This chapter provides concrete strategies to help educators take that next step. It presents examples of good practices, tools that promote creativity and autonomy, and ideas for building digital pathways that foster motivation and engagement. Whether you are working with learners who are autonomous and high-achieving, or with twice-exceptional learners who need differentiated support, the approaches outlined here aim to make digital education a lever for inclusion and talent development.

Technology should serve as a means, not an end. With the right mindset and support, educators can harness the power of digital resources to create inclusive, stimulating and future-ready learning environments for all learners.

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The Talent e-Portfolio

Digital or not, what is a portfolio?

A portfolio is a structured and evolving collection of personal artefacts, texts, documents, certificates, images, recordings and multimedia productions, that provides evidence of a learner's knowledge, skills, attitudes and progress over time. While portfolios have long been used in the arts and vocational sectors, their educational relevance has expanded considerably, supported by both pedagogical theory and digital innovation.

In educational contexts, the portfolio serves not only as a showcase of achievements but also as a formative tool for learning. It reflects the constructivist perspective of education, in which learners actively build their knowledge through experience and reflection. According to Paulson & Paulson (1991), a portfolio is “a purposeful collection of learner work that exhibits the learner’s efforts, progress, and achievements... [and] includes learner participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of learner self-reflection.” This definition highlights the central pedagogical aims of a portfolio: ownership, autonomy, and self-evaluation.

Whether physical or digital, the portfolio supports a shift from traditional summative assessment, based on final outcomes, toward a more holistic and continuous evaluation of the learner’s path. It values the process as much as the product, and promotes dialogue between learners, teachers, and other stakeholders.

The digital portfolio, often referred to as e-portfolio, enhances the functionality of the traditional version. It allows learners to easily integrate various media formats (video, audio, hyperlinks, animations, etc.), update content regularly, and share their portfolio with a wide audience. Thanks to cloud-based platforms, the e-portfolio becomes accessible anytime, anywhere, by multiple actors: teachers, educational advisors, school management, and even families. Access rights can be defined: editing privileges may be reserved for the learner and a mentor teacher, while consultation rights may be granted to others as needed.

Furthermore, the e-portfolio can serve as a transversal tool, connecting different subjects and learning environments. It can bridge the formal curriculum and informal or non-formal learning experiences, such as hobbies, voluntary work or artistic practices, offering a more complete portrait of the learner. As such, it resonates with the 21st-century vision of education: personalised, flexible, inclusive and oriented towards lifelong learning.

Talent e-Portfolio

The Talent e-Portfolio, as conceptualised by Purcell & Renzulli (1998), emerges from the field of gifted education. It is grounded in an enrichment model that values the identification and development of diverse potentials, not limited to academic performance. The model encourages every learner to discover and express their individual talents, whether cognitive, creative, artistic, athletic or social.

Rather than being reserved for so-called "gifted" learners, the Talent e-Portfolio is meant for all learners. Each learner is invited to create and maintain a personal portfolio, either within their class group or across the whole school. This portfolio becomes a space to collect and organise tangible traces of their progress, achievements and reflections. The guidelines are simple: gather evidence of success, regardless of the domain.

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This might include a swimming certificate, a photo of a recycled bag sewn at home, a clip of a piano audition, the draft of a story written for fun, or a drawing made after a museum visit.

Over time, the portfolio becomes more than a storage space, it turns into a narrative of learning, where learners articulate their growth, question their approaches, and set new challenges. It provides a unique opportunity to celebrate multiple forms of excellence, often overlooked by conventional schooling.

Pedagogical value for the learner

Commitment

Maintaining a portfolio fosters a sense of engagement in learning. Learners are invited to look back at what they have done, assess the value of their own contributions, and give meaning to their efforts. This process supports metacognition, thinking about one's own thinking, and encourages learners to take responsibility for their development.

By reflecting on both successes and difficulties, learners are able to identify patterns in their behaviour, preferences, and motivations. They develop a deeper understanding of what helps them learn, and become more willing to invest in their own progress. This introspective process promotes resilience and pride, especially when they revisit earlier entries and realise how far they have come.

Autonomy

The portfolio empowers learners to make decisions about the content they include and the way they present it. Over time, and with proper guidance, they move from a supervised activity to a more self-directed practice. This reinforces their capacity for initiative, self-regulation, and personal goal-setting.

The learner begins to build a personalised learning environment, curated by them, for them. This growing autonomy is not only useful within the school setting; it also equips the learner for further education, job applications, or artistic and entrepreneurial projects later in life. The portfolio becomes a lifelong learning tool, anchored in habits of reflection and proactive action.

Creativity

Creativity thrives when learners are given the freedom to choose their own modes of expression. The portfolio encourages them to experiment with various digital tools, to explore different ways of presenting information, and to blend text with visuals, sound or even interactivity. This multimodal approach aligns with the Universal Design for Learning (UDL), which advocates for multiple means of expression and engagement.

In designing their portfolio, learners may develop storytelling skills, graphic design awareness, digital editing techniques or critical thinking. They also learn to make aesthetic choices, organise content in meaningful ways, and consider how others might perceive their work, key skills in both academic and professional life.

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Pedagogical value for the educational team

The talent portfolio provides a rich and dynamic source of information for educators. Beyond grades and test scores, it gives access to the learner's processes, motivations, interests and learning strategies. This helps educators to better understand each learner's profile and to tailor their pedagogical approaches accordingly.

In the context of inclusive education, the portfolio is a valuable tool for differentiation. It highlights each learner's strengths, learning preferences and areas of passion, often revealing hidden talents that might otherwise remain unnoticed. With the learner's permission, teachers can consult portfolios to design meaningful challenges, personalised feedback or targeted interventions. The portfolio can also facilitate collaboration between subject teachers, learning support staff, and extracurricular educators.

Moreover, the portfolio strengthens the learning partnership between learners, teachers and parents. It fosters transparency and encourages constructive dialogue during school meetings or individual coaching sessions. It can also be integrated into evaluation practices by offering an alternative or complementary form of assessment: narrative, descriptive, qualitative, and learner-centred.

Examples of e-portfolios for schools

Qualifying Learning Portfolio

In full-time qualifying education in French-speaking Belgium, learners in technical and vocational pathways (from secondary 4 to 6) manage a structured portfolio as part of their curriculum. This includes general administrative information, a learning pathway outlining validated units, a school-year calendar, self-evaluations, and a personal section named Portfolio.

Here, learners compile their best technical projects, creative productions, and completed assignments, often accompanied by plans, photos or reflective notes. This portfolio not only supports self-monitoring and learning transfer but also helps learners prepare for job applications or further education by providing a professional record of their capabilities.

e-Portfolio created using Google Sites

Google Sites offers a simple and accessible platform to build personalised portfolios. On the homepage, thematic categories such as "Achievements," "Strengths," and "Goals" guide learners toward introspection and organisation. Each school subject is linked to a dedicated page where the learner can summarise their key learning, highlight meaningful work, and upload supporting evidence, be it text, audio, video or image.

This structured, longitudinal approach promotes continuity across years and disciplines, and encourages learners to revisit and refine their content as they grow.

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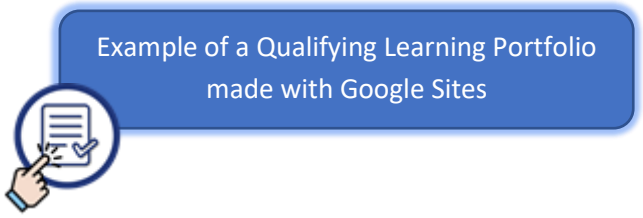
Talent e-portfolio created using Canva

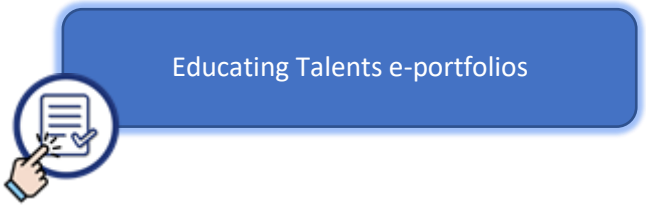
Canva, a graphic design tool popular in schools, provides user-friendly templates that can easily be adapted for educational purposes. A teacher might choose one with their learners and customise it together, or let each learner select and adapt their own design, based on a common structure. Suggested sections include: “My Greatest School Achievements,” “My Extra-Curricular Successes,” “Projects I Did on My Own,” “What I’m Working on,” and “What I’d Like to Improve.”

This flexible, playful tool encourages learners to take ownership of both form and content. It can also be printed, presented during school exhibitions, or shared digitally with families or future partners.



Educating Talents e-porfolios

Durint the TLA and the experimentation in their classrooms, teachers had the opportunity to keep an e-portfolio in which they could document their experimentation with one of the methodologies proposed during the TLA. Here you can find each teacher’s e-portfolio.



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Digital Museum

What is a virtual museum?

Just as the Louvre and the British Museum do with their works of art, the idea is to present a series of relevant documents, whether works of art or not, on a given theme in a virtual space whose layout is similar to that of a museum.

A virtual museum is therefore a fictitious three-dimensional construction whose configuration is borrowed from video games or virtual reality.

This space is designed using a software such as Visitor, Framevr, Emaze or Cospaces, which have in common that they are accessible to all, from a technical point of view, while being user-friendly, intuitive and well-structured.

The virtual museum is made up of several sections containing different collections. Each collection comprises a main element and additional elements in different formats: images, sound, video and/or text.

The educational approaches to virtual museums are many and varied. The simplest is to offer learners an immersive experience in a virtual museum. Learners can then discover the different works at their own pace, free to linger wherever they like, following an itinerary that they themselves determine, while being able to search directly for additional information if they feel the need, without delaying the rest of the class.

At the other extreme, one way of using virtual museums in the classroom is to ask learners to create a virtual museum on a given theme from scratch, choosing not only its architecture (number of rooms per floor, size of rooms, for example) but also being responsible for the collections that will be presented (choosing the works, creating introductions and explanations, and even creating some of the exhibits themselves). We're going to take a closer look at this last option.

Pedagogical interests

Involvement

By working on a project of this scale, learners can feel invested in their work and be more motivated to participate actively. They may also be more inclined to engage in quality work, as they can see the value of their work in creating a tangible and meaningful project.

Autonomy

In order to successfully complete this collective project, learners will be required to develop their organisational and time management skills in order to carry out the various stages necessary for creation, such as research, design, writing texts, creating original multimedia content, etc. They will also be encouraged to respect the group's instructions and operating rules, to avoid constantly asking the teacher for help, and to

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make choices and take the initiative. The different forms of autonomy (physical and practical, emotional, social and cognitive) will therefore be worked on throughout the project.

Encouraging collaboration

Creating a virtual museum is conducive to collaborative projects that encourage learners to work together to achieve a common goal. Learners can divide into teams to gather information about different aspects of the museum and work together to create a coherent exhibition.

Encouraging creativity

Creating a virtual museum encourages learners to be creative in the way they present information and artefacts. Learners are encouraged to use digital tools to create multimedia presentations, virtual tours or animations to make their museum more engaging.

Developing research skills

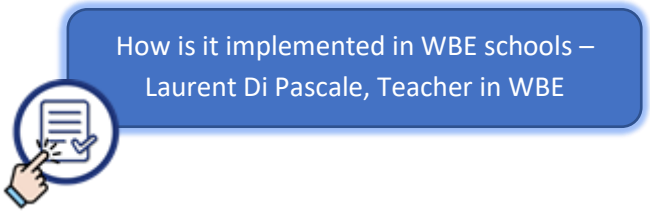
To create a virtual museum, learners need to research a particular topic, gathering information and choosing objects to include in the museum. This research helps them to develop their research skills, including gathering and analyzing information from different sources.

Deepen knowledge of a specific subject

Creating a virtual museum is a way of deepening knowledge of a specific subject by focusing on artefacts or objects related to that subject. Learners can become experts on a particular subject and share their knowledge with visitors to the virtual museum.

Improve synthesis, communication and critical thinking skills

In order to share their knowledge with visitors to the virtual museum, learners train their critical thinking skills by assessing the relevance and reliability of sources, identifying potential biases and gaps in the information available. They also have to work on their synthesis skills by grouping together the main ideas, establishing logical links between them and creating a clear and relevant narrative. The information collected is transmitted coherently in their virtual museum using different media.



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Pull-Out-programmes for talented and highly gifted children at JKU COOL Lab

*Mag. **Michaela Schwinghammer**, Cool Lab, Johannes Kepler University, Upper Austria*

The JKU COOL lab at Johannes Kepler University (JKU) in Linz, Austria, supports learners by fostering a creative and interactive learning environment that emphasises computational thinking, programming, and innovative educational practices. One notable approach includes initiatives like "Peer Learning and Talents Exchange in Programming," where learners engage in collaborative learning to enhance their skills and share expertise in programming. These activities not only encourage knowledge exchange but also aim to lower dropout rates in computer science programmes. By incorporating peer-teaching models and integrating subjects such as dance and music with computer science, the COOL lab promotes both technical competence and creative expression among learners.

Moreover, the Mini Talente Club focuses on promoting learners in the STEM fields. It serves as an initiative to foster young learners' interests and skills in these areas. Specifically, the club emphasises providing enriching activities designed to inspire and develop early proficiencies in STEM subjects, nurturing potential talents from a young age.

What is the COOL Lab?

The COOL Lab is an innovative teaching-learning workshop for digital education and computational thinking (CT). Furthermore, the COOL Lab is a teaching, learning, creative, and research workshop for ALL subjects, with different, sometimes changing topics and labs in which depending on their interests and skills, visitors slip into the role of learners, educators, researchers, and developers trying out and/or using the latest technologies.

The **COOL Mini Club** is a cooperation of the JKU and Talente Oberösterreich (Talente Upper Austria) for highly gifted children between the age of 7 and 10. Every semester a new Club starts with about ten learners and two advisors. All participants meet at the JKU every second week for workshops on different Science, Technology, Engineering, and Mathematics (STEM) topics. In the club, the learners can carry out experiments themselves, pursue questions of natural science, and implement individual proposed solutions.

Once a year a celebratory closing event takes place, where the participants present all their developed creative products to their friends, relatives, and the public.

The **COOL Girls Only: IT Club** is dedicated to girls between the age of 7 and 10, who get to know Computer Science (CS) playfully. The learners get insights into a wide variety of topics in Computer Science and can carry out code programming and experiments themselves at JKU every second week for one semester. Furthermore, they try out some basic Computational Thinking tasks and contribute their ideas, implement individual proposed solutions and develop creative products that they present to friends, relatives, and the public at a celebratory closing event once a year.

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The **COOL Talente Club** takes place at JKU COOL Lab every Semester with a specific motto. After a few workshops in the fields of Science, Technology, Engineering, and Mathematics (STEM), the young scientists, aged 10 to 15 years, create a special product of their own choice supported by older learners of the JKU, who work together in small groups. The main topic is announced at the beginning of the club. Once a year, all projects are presented at the celebrating closing event.

Read more about the COOL Lab

See more about the COOL Lab

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Chapter 5: Strategy to improve awareness among educators

***Christophe Wells**, M. Ed, European Project Manager, APRECCA, France*

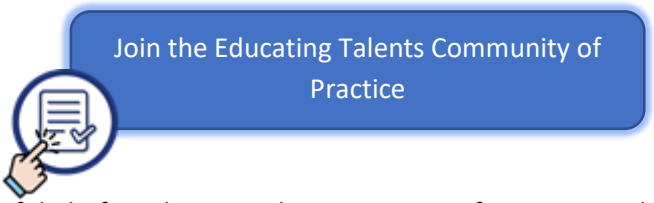
Community of Practice

The Educating Talents partners believe passionately in the concept of community of practice and we have linked all work on the project and our dissemination strategy to the practical adaptation of the Community of Practice model (CoP), developed by Wenger (1991).

It creates stimulating opportunities for stakeholders from different countries to exchange knowledge in a non-formal way, using interactive pedagogical methods and create lasting relationships. It will value and recycle knowledge, experience and culture – repackaging and reselling for future benefits in new potential life and professional opportunities.

In particular, it allows sharing across Europe to educators, organisations and countries not directly involved in the ET project.

The Educating Talents Community of Practice was created on the EPALE platform in October 2022.



EPALE is such a useful platform because the community of practice model should not be limited to the local area or the regional area or even within member states. The potentially most useful and impactful CoP is a community built around the entire European Area. Partners also believe that different generations have skills competencies and experiences which if they share these with other generational groups, the amount of learning can be increased and the opportunities for meaningful and fulfilling employment dramatically increased.

Creating a pan-European community of practice (CoP) for educators who work with talented learners offers tremendous potential for improving teaching methodologies, sharing resources, enhancing cultural and educational integration, and fostering innovation. As Europe grows more interconnected through shared economic and political agreements, an equally integrated approach to education, especially for talented learners, is both timely and valuable.

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Below the ET partners explore the 6 key dimensions of added value that such a CoP would bring to the educational landscape, specifically in the context of talented learners who often require specialized teaching methods and support.

Fostering Collaborative Learning and Knowledge Exchange

One of the most significant benefits of a pan-European CoP for educators is the opportunity for collaborative learning and the exchange of knowledge. Talented learners have unique needs that are not always adequately met by traditional education systems. By creating a platform where educators can share best practices, methodologies, and pedagogical innovations, the quality of education for talented learners can improve dramatically.

European countries have varied approaches to identifying and nurturing talented learners. For example, some countries emphasise standardized testing, while others may focus on holistic assessments, project-based learning, or fostering creativity. By bringing these different approaches into conversation, educators can benefit from the strengths of other systems. This cross-pollination of ideas would help create a more holistic understanding of talent education and allow for the refinement of techniques that are effective across diverse learning environments.

Moreover, a CoP would enable teachers to access a larger pool of resources, including research papers, case studies, teaching materials, and even digital tools. The diversity in curriculum design and instructional strategies across European nations can be harnessed to create a more robust toolkit for educators. Sharing these resources would be particularly valuable for those working in under-resourced socio-economic areas with learners with fewer opportunities or limited resources, where access to specialised training or materials may be limited.

Professional Development and Continuous Learning

Another added value of a pan-European CoP for educators is the opportunity for professional development. Teachers often need support in refining their skills to better serve talented learners, who may present challenges in the classroom due to their advanced capabilities or different learning needs. A CoP would provide access to a wider range of professional development opportunities, from workshops and webinars to peer mentorship and coaching. This would not only improve the quality of teaching but also help educators feel more confident and competent in their roles.

The CoP could also offer accreditation or certification programmes, which would further incentivize participation and commitment to professional growth. These programmes could be co-designed by educational experts from multiple countries, ensuring that they are rigorous, comprehensive, and applicable across various educational contexts. This would help to standardize the qualifications and expertise of educators working with talent learners, raising the overall quality of education across Europe.

Furthermore, the CoP would allow educators to engage in reflective practice by discussing their experiences, challenges, and successes with their peers. This type of professional dialogue is crucial for continuous learning and growth. It would also help educators to stay current with the latest research in the

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field of talented education, ensuring that they are always equipped with cutting-edge knowledge and techniques.

Promoting Equity and Inclusion

A pan-European CoP would also contribute to the promotion of equity and inclusion in education. Talented learners come from all backgrounds, and one of the key challenges in many European countries is ensuring that learners from underrepresented or disadvantaged groups have access to opportunities that nurture their talents. By pooling knowledge and resources, the CoP could help address these disparities by offering strategies for identifying and supporting talented learners from diverse backgrounds.

Different countries have varying levels of success in addressing the educational needs of talented learners from low-income families, ethnic minorities, or those with disabilities. For instance, some nations have developed targeted programmes to increase diversity in talent education, while others struggle with systemic barriers that prevent equal access to advanced learning opportunities. A pan-European CoP would allow educators to learn from countries that have made strides in this area and implement similar initiatives in their own contexts.

Moreover, by fostering a community that values diversity and inclusion, the CoP would create a more culturally responsive approach to educating talented learners. This is particularly important in Europe, where migration and demographic shifts have made classrooms more multicultural than ever before. Educators need the tools and knowledge to address the unique challenges that come with teaching talented learners from different cultural backgrounds. The CoP would offer a platform for discussing these challenges and sharing solutions, ultimately contributing to a more inclusive and equitable education system for all talented learners across Europe.

Encouraging Cross-Border Research and Innovation

A pan-European CoP would serve as a catalyst for cross-border research and innovation in the field of talent education. Europe has a rich tradition of educational research, with many countries producing groundbreaking studies on how to best support talented learners. However, much of this research remains siloed within national borders, limiting its impact. A CoP would break down these barriers by encouraging collaboration between researchers, educators, and policymakers from different countries.

Joint research projects could explore the effectiveness of different teaching methods, curriculum designs, or intervention programmes. For example, researchers might investigate how different countries approach talent development in the STEM fields versus the arts, or how various psychological and emotional support systems impact talented learners. By conducting large-scale, cross-border studies, the CoP could generate more comprehensive data and insights that would benefit all participating countries.

Additionally, the CoP could promote the development of new pedagogical tools and technologies designed specifically for talented learners. By connecting educators with technologists and innovators across Europe, the CoP could drive the creation of digital platforms, educational apps, and other resources that are

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tailored to the needs of gifted learners. These innovations could then be shared and adapted for use in different countries, further enhancing the quality of talent education across Europe.

Strengthening European Identity and Cohesion

In addition to the direct educational benefits, a pan-European CoP for educators working with talented learners would also contribute to the broader goal of fostering European identity and cohesion. Education has long been recognised as a key driver of social cohesion, and by bringing together educators from across Europe, the CoP would help to build a sense of shared purpose and solidarity.

Talented learners are often future leaders in various fields, from science and technology to the arts and politics. By fostering a pan-European network of educators dedicated to nurturing these learners, the CoP would play a role in shaping a future generation of Europeans who are not only highly skilled but also deeply connected to the continent's shared values and cultural heritage.

Moreover, the CoP would offer opportunities for educators and learners to engage in cross-cultural exchanges, both virtually and in person. This could include joint projects, exchange programmes or online collaboration between classrooms. Such initiatives would help talented learners develop a broader perspective on the world and cultivate a sense of European citizenship. At a time when political and social divisions threaten to fragment Europe, the CoP could serve as a unifying force, bringing together educators and learners from diverse backgrounds to work towards common goals.

Enhancing Policy Advocacy and Educational Reform

A pan-European CoP for educators working with talented learners could also serve as a powerful advocate for policy change and educational reform. Talent education is often overlooked or underfunded in many countries, leading to a lack of support for talented learners. By organizing educators across Europe, the CoP could amplify their voices and push for greater recognition of the needs of talented learners at both national and EU levels.

The CoP could engage in policy advocacy by producing reports, recommendations, and position papers that highlight the importance of gifted education and propose concrete reforms. These documents could be used to influence policymakers, ensuring that the needs of talented learners are prioritized in national education agendas. Furthermore, the CoP could collaborate with organisations such as the European Union or the Council of Europe to promote gifted education as a key component of educational policy across Europe.

Additionally, the CoP could play a role in shaping the future of education by advocating for the integration of talent education principles into mainstream educational reform efforts. For example, the principles of personalized learning, creativity, and critical thinking that are central to talent education could be extended to benefit all learners, not just those identified as talented. By positioning itself as a thought leader in the broader field of education, the CoP could influence the direction of educational reform in Europe for years to come.

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Conclusions

The creation of a pan-European community of practice for educators working with talented learners would bring significant added value to the educational landscape of Europe. By fostering collaboration, promoting professional development, enhancing equity and inclusion, encouraging research and innovation, and advocating for policy change, such a CoP would not only improve the quality of education for talented learners but also contribute to the broader goals of European integration and cohesion.

The unique challenges faced by talented learners require specialized knowledge and resources, and a pan-European CoP would provide educators with the tools and support they need to meet these challenges effectively. In doing so, the CoP would help to ensure that talented learners across Europe receive the high-quality education they deserve, enabling them to reach their full potential and contribute to the future success of the continent.

The community of practice model is fundamental to the ongoing impact of the Educating Talents project.

Co-funded by the European Union

Chapter 6: How to support talented learners in other ways

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Talented learners often reveal their strengths outside traditional lessons, when solving real problems, creating something original made by their hands or taking part in activities that challenge them in new ways. This chapter focuses on opportunities that can be used outside a standard classroom settings, showing how talent can grow through competitions, tests, experience, physical exercise, culture, art, interaction and personal engagement etc. Some initiatives described here support learners through long-term mentoring or individual coaching. Others provide access to national and international events, creative spaces or physically active environments where learners can explore, create, perform and reflect. The key is variety, because talented learners need more than one way to show what they are capable of. They also need challenges, inspiration and motivation to develop.

Educators work not alone and can get support from other experts and professions to teach, notice, encourage, inspire, motivate and guide. Together can they support learners to grow in confidence, take initiative and connect their strengths to create, solve real tasks, perform and make new innovations. In the following sub chapters, you will discover practical and inspiring ways to support talented learners in other ways. These other ways approach the trust in the talented learners potential and invite them to develop as whole individuals.

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Mensa

Mensa is a world wide organisation with members all over the world. The organisation provides IQ tests. If you get over a certain point of IQ you will be able to become a mensa member. Mensa also aims to support gifted learners or as we in this eHandbook refer to talented learners. Talented learners are more wide and can also refer to the skillful handed or highly motivated. Gifted learners are used for learners with high IQ. Since this eHandbook has a wider approach we use both in these parts for Mensa, Mensa Youth and Gifted Children Programme.

Mensa is most known from the IQ tests they offer. If you as an educator think that you have a talented learner or a gifted learner you can inform the learner about the IQ tests Mensa offers. Mensa offers the test in Sweden after the learner turns 18 years old and it can vary from country to country. The test can inspire and motivate and give the learner a network of other talented or gifted learners.

You as an educator can also get advices, material and support to recognise and support talented or gifted learners, from Mensa. It can vary from country to country on how Mensa works with the young talented or gifted learners. In Belgium they have an organisation called Mensa Youth and in Sweden they have a programme called Gifted Children Programme. In the following two sub chapters you will find information about both of them.

Mensa Youth MY

MY Be(Belgium) is a non-profit organisation dedicated to help young people with high IQs in Belgium and France. Its goal is to help young people aged 0 to 25 with high IQs to blossom and to support the adults who accompany them. Its mission is to provide a stimulating and caring environment that allows these young people to blossom, while offering them and their loved ones support and a listening ear. In the context of MY Be asbl, both children and adults are referred to as “gifted” if they have scored within the top 2% of the population on a recognised intelligence test.

MY BE believes that whether children and learners have learning difficulties, average intelligence or an IQ in the top 2% of the population, they will all benefit from the appropriate kind of help along the way in order for them to reach their full potential. MY Be programmes provide children and young people with the extra support they often need to develop their individual capabilities, additional assistance that all learners worldwide should receive. More information: https://my-be.eu

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MY in Belgium offers a programme for the young talented and gifted persons. Those programmes provide children and young people with the extra support they often need to develop their individual capabilities, additional assistance that all learners worldwide should receive. During the steering committee's transnational meeting in Belgium in October 2023, we got a lecture from Thierry Marchand from MY (formerly Mensa Youth BE).

The talented or gifted young person can join and participate in different activities and networks with other talented or gifted people to join their peers. Different ways to participate in the activities are mainly this ways:

- Parents in MY
- Word of mouth outside MY
- Communications on social networks
- Participation in trade fairs (education fairs)
- Group testing campaign (reliable and inexpensive)

MY offers support to talented or gifted learners presenting a high IQ and they also offer support to adults accompanying them. The adults that they support can be parents, teachers and health professionals. Some of the activities they arrange for the youth are online board games, visits, sport, workshops, family annual BBQ and they also arrange week-end and summer camps. To the adult accompanying persons they offer discussion tables with peers, conferences, workshops, collecting and sharing clinically and scientifically correct information. For example, they have participated in the writing of the first book of reference in French for the health and education professionals “Psychologie du haut potentiel”. MY also provides support to the ones that need it by redirecting to professionals.

The talented or gifted young person can become a member by registering free of charge. To become a full member and have access to vote the youth must present an IQ test result above 98% of the result of the population. To join MY you can contact : info@my-be.eu

If you as an educator want to get in contact with MY or a local Mensa organisation and want more information you will find it at their webpages:

https://my-be.eu and https://www.mensa.org/

Gifted Children Programme

During the Steering Committee meeting in Stockholm in April 2024 one of the informers was presenting the Gifted Children Programme for the delegates of the steering committee. Gifted Children Programme(GCP) is a programme for parents and educators to develop an understanding for persons with talents or special giftedness and to meet their needs to reach their full potential. The programme was initiated by Mensa Sweden to raise awareness and provide support for gifted learners and GCP is implemented in Sweden by

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Mensa Sweden. Gifted Children Programme have several engaged volunteer working informers under the lead of Mensa Sweden. All informers are members of Mensa and have done the informer education for GCP. The informers offer lectures to parents and educators to support them on how they can recognise talented and gifted learners and how to support them.

In order to support the gifted or talented learner you need to know the characteristics for a gifted learner. GCP presents a list of 26 characteristics. Particular attention is given to the first 18 especially the top 6, which are considered the most distinguishing features of talented or gifted learners that diverse the gifted and talented learner from others. You can also find the list on their webpage https://mensa.se/sarskiltbegavade-barn/

Learns easily	Perfectionistic	Shows mature judgment for their age (at times)
Has an extensive vocabulary	Persistent in their interests	A keen observer
Has an excellent memory	Prefers older peers or adults	Has a vivid imagination
Very curious	Has a great sense of humor	Good at puzzles
An early or eager reader	Exceptionally creative	Morally sensitive
Finds math easy	Learns independently	Very energetic
Has good concentration (when interested)	Values fairness	Intense
Has a wide range of interests	Shows compassion	Sensitive (easily hurt)
	Reasons well (a good thinker)	
	Frequently questions authority	

GCP says that special giftedness is not a diagnosis. But as any other learner there can be a diagnos and the talents can hide this. This is called “Twice Exceptional”.

To meet talented and gifted learners in education. GCP uses something they call an “ABC for the Pedagogue”, A for Acceleration, B for enrichment and C for coordinating(central) persons.

*“**Acceleration** - Learning often occurs much faster for gifted children, and they usually do not need to repeat material to the same extent as other children. This may mean that some children need to skip one or more grade levels, either in a single subject or across all subjects. Assess the child’s knowledge level and adapt both the material and the pace of instruction accordingly. Do not leave the child alone with the material, gifted children need just as much support and instruction as other children, but on their own terms.*

***Enrichment** - Allow the child to explore topics that may fall outside the standard curriculum or that span across multiple subjects. Focus on big, investigative questions that can be of benefit to others. Make sure that extra or in-depth materials are readily accessible in the classroom.*

***Coordinating persons** - It may be necessary to have someone within the school who acts as a central coordinator and can check in on how things are going with the learner, the guardians, and the respective*

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teachers. To better support the development of their thoughts and interests within the school, but partly outside the boundaries of the regular classroom, it can be helpful if the school assigns a trusted adult who can listen to the learner's reflections. This mentor does not necessarily need to be a specialist in the learner's area of interest but must be interested in the learner's development and be able to listen and encourage in a supportive way. The mentor may also serve as a subject-specific mentor if they can provide more concrete challenges within the learner's area of interest.

Mentors from outside the learner's school, for example from a nearby university or college, may also be relevant. In some cases, Mensa GCP can assist in finding a suitable mentor within specific fields".

Source: Swedish National Agency for Education (Skolverket)

If the talented or gifted learner does not get recognised and does not get the support they need, they can suffer from several unfavorable situations and conditions such as under stimulation, bored out, mental illness and that they feel left out etc. Gifted Children Programme can offer several links, facebook groups and a pedagogical network for you in order to support the talented and gifted learner. The core mission of the informers is to raise awareness about giftedness and to support schools in working effectively with talented or gifted learners. Schools and organisations can request and book a visit or a lecture from a GCP informer free of charge, for more information, contact gcp@mensa.se To find out more you can visit their website https://mensa.se/gcp-gifted-children-program/, https://mensa.se/sarskiltbegavade-barn/

Educating Talents' Network, Upper Austria

The Upper Austrian School authority Bildungsdirektion Oberösterreich is the main administrative public body in school administration in Upper Austria. It is responsible for 22.751 teachers in general and vocational education and 121.000 pupils in primary and secondary education as well as pre-school education. Bildungsdirektion OÖ is responsible for the quality management in all schools, for implementing national educational programmes especially the digital initiative and for organizing international teacher training and pupils exchange within the Erasmus+ programme.

All activities are coordinated by HR Mag. Dr. Alfred Klampfer, head of Bildungsdirektion Oberösterreich, responsible for strategies and evaluation.

Each of the Upper Austrian schools has a special contact person who helps the schools with their school development plans, their internal and external evaluations and the teacher training plans.

Bildungsdirektion also organises the cooperation with all educational key players in Upper Austria. The pedagogical services of Bildungsdirektion OÖ are also responsible for subject related curricula and their further development and implementation in all schools. Regional subject coordinators are responsible for this. They also organize teacher training and are the link to the individual subject teachers at the schools in Upper Austria. Their expertise is also involved in the development, implementation and evaluation of all Erasmus+ activities.

Eduacting Talents' network, Upper Austria

The Upper Austrian Talent Competence Centre supports highly gifted pupils in Upper Austria. Starting with a giftedness assessment in the 3rd grade, the diagnosed children are accompanied on their further educational path. This is done primarily through an extensive range of courses, ranging from one-day courses

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in the individual educational regions, to courses lasting several days at the Schloss Traunsee Academy, to one-week courses at the summer academies. Another important part of our work is counselling for parents, teachers and kindergarten teachers.

See more about the Summer Academy SOAK

See more about the OÖ Video England to go

- Pädagogische Hochschule Oberösterreich (Pedagogical university): Internationales Schulnetzwerk für kreatives Problemlösen - School of Creative Solutions
  - contact person: Dr. Kurt Haim
- Johannes-Kepler-University, Linz: COOL Lab | Schulangebote JKU Linz
  - contact person: Dr. Barbara Sabitzer
- Talente Upper Austria: talente Hochbegabtenförderung Oberösterreich
  - contact person: Dr. Ulrike Moser
- Welios Science Centre, Linz: www.welios.at
  - contact person: Dr. Cordula Stroh
- BRG Wels Wallererstraße: www.brgwels.at
  - contact person: OstR Mag. Gisela Gutjahr
- Franziskus-Gymnasium, Wels: www.franziskus-gym.at
  - contact person: Mag. Melanie Danner
- Stiftsgymnasium, Schlierbach: www.gymschlierbach.eduhi.at
  - contact person: Mag. Karin Höllerich

WorldSkills

Not all talented learners thrive in academic settings - many shine through their hands-on skills, creativity, and problem-solving abilities in practical contexts. These learners often do excellent and succeed in handicrafts, vocational work and technical tasks. To demonstrate an exceptional talent for the skillful handed that deserves recognition, support, and tailored opportunities, we as educators need to have different pedagogical tools. WorldSkills provides a powerful platform to celebrate and promote this kind of talent globally and can be a tool for you to support your talented learners within vocational education.

WorldSkills is a global organisation that champions vocational skills, recognising the vital contribution skilled professionals make to economic growth, innovation, and sustainable development. It was founded in 1946 after the second world war. After the war it was a huge lack of skilful handed that threatened to create a new economic depression. To motivate and inspire young people to aim for a vocational career the competitions was created. Worldskills mission is *"To raise the profile and recognition of skilled people, and show how important skills are in achieving economic growth and personal success."* The first modest event was held in Madrid 1950 and 1958 was the first competition abroad in Brussles, Belgium. Through international competitions, national initiatives, and education-focused events, WorldSkills offers inspiration, motivation, and concrete pathways for learners gifted in vocational education and training (VET).

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WorldSkills continues to develop and promote the power of skills. Competitions at national, regional, and global levels allow young people to showcase their excellence in over 60 skill areas - from landscape gardening and carpentry to hairdressing, robotics, and graphic design. These events are not only a contest but as springboards for professional development and personal growth.

WorldSkills are not "just" competitions at different levels. WorldSkills, can make learners more aware and cherish their skills and the experience can strengthened their technical abilities, built resilience, and connected them with a global network of like-minded peers. This kind of international exposure and skill benchmarking is invaluable for learners whose talents lie in practical, hands-on talents.

"Through our exciting and diverse projects, we cover a wide range of areas to develop and promote skills."

- ✓ Youth
- ✓ Capacity Building
- ✓ Africa
- ✓ Museum
- ✓ Standards and Assessment
- ✓ Entrepreneurship
- ✓ Awards and Credentials
- ✓ Research
- ✓ Impact

Supporting methods within WorldSkills:

- ✓ Training camps
- ✓ Career Mentoring
- ✓ Certifications
- ✓ "Open house" events
- ✓ Facilitate for collaboration between school and business
- ✓ Etc.

Who can join these competitions? If you have learners or alumni learners in VET education that are under 25 years then they can join. The VET education needs to be represented in one of the many skill areas. Then you as a teacher or educator can register for them to take part in the competition. These competitions last for a couple of days so you need to make you and your learners available over that time to fulfil the competition. Since this is a competition, you need to win to go further. You start with arranging your own school competition. Then the winning team or teams can you as educator sign up to take part in the national competition. The winners of the national competition goes to EuroSkills and then WorldSkills. Materials documents and other information to get you started to set up your own competition at your school will you find at your member country website. See contact information.

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In Sweden, WorldSkills Sweden plays a vital role in identifying and supporting young talents, often in close collaboration with vocational schools, apprenticeship programmes, and national industry partners. Through regional competitions, training camps, and inspirational stories, the organisation fosters pride in craftsmanship and motivates learners to pursue excellence in their field. You as an educator can find WorldSkills in your own EU country to start or proceed with a cooperation to support your skillful handed talented learners.

At a worldwide level you will find events like WorldSkills International (WorldSkills Competition) and at the European level it is WorldSkills Europe (EuroSkills). You will also find WorldSkills at a national level in the links in the contactlist. You will also find WorldSkills as local school competitions and you can set up your own. These events engage with global themes like AI, sustainability, and equity in education further emphasise that vocational skills are not secondary - they are central to future-ready education systems. The inclusion of WorldSkills in international forums like UNESCO's Global Education Coalition and the Cedefop-OECD symposium underlines its impact on educational policy and reform.

For educators and policymakers, incorporating the spirit of WorldSkills into the classroom or curriculum means recognising and supporting skillful-handed learners. This could involve:

- Creating opportunities for applied learning and practice-based challenges
- Encouraging participation in national and international skills competitions
- Building links between schools, companies and industry partners
- Showcasing success stories of VET learners as role models
- Fostering gender equality and inclusivity within vocational education and craft professions

Ultimately, WorldSkills is more than a competition - it's a celebration of the many ways young people can excel. It is also a pedagogical tool for educators that can stimulate, motivate and inspire talented learners. For talented learners who express themselves through their hands and craftsmanship, it is a place to be seen, to grow, and to reach their full potential.

Download the Contacts sheet for Worldskills

Gifted Education in the Dual System in Upper Austria

Detecting, fostering and developing potentials of apprentices in the dual educational system

Description of the target group / entry requirements

The target group of this programme comprises teachers of vocational schools as well as trainers of companies who are interested in fostering (highly) able apprentices. Entry requirements are valid diploma for

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vocational schools (for the teachers) or valid diploma for trainers of apprentices in companies or persons of the school authorities for vocational education.

Credits and duration of the study programme

The study programme has a duration of two semesters with 15 ECTS credits.

Certificate

The graduates of the study programme receive a certificate issued by the "Pädagogische Hochschule Oberösterreich" (Pedagogical University Upper Austria).

Description of the content of the training

In the study programme ***"Detecting, fostering and developing potentials of apprentices in the dual educational system"*** learners and trainers deepen their knowledge of gifted and talented education and thus expand their repertoire of pedagogical, didactic and diagnostic competences with regard to gifted and talented education in school settings in collaboration with training settings in companies.

The specialty of the training is the focus on practical intelligence. Apart from the basic scientific information about giftedness in general, creativity, achievement and underachievement, testing and coaching/mentoring the content of the training specifies on fields of giftedness that might not have been detected by schools. That is why the collaboration between schools and companies plays an important role in the training, e.g. by excursions to companies which have developed excellent plans for gifted education in different fields of work, excursions to Europe/World Skills contests etc.

Curriculum

The study programme aims at enabling learners to expand their specialist knowledge and action competences in the field of gifted and talented education. Theories, concepts and models of giftedness, talent, intelligence, motivation and creativity provide the background for understanding. A broad understanding of giftedness is consciously taken as a basis, which considers the potential and interests of apprentices in different areas, especially those not considered by school education. On this basis, methods of pedagogical-psychological diagnostics and the individual promotion of giftedness and talent can be used to sustainably orientate teaching and practical training towards the learning and development needs of the apprentices.

Teaching and Learning concept

The teaching and learning concept of the study programme follows the principles of adult didactics in the sense of appropriation didactics. Its design intends to systematically link theory units and practical transfer experiences.

In addition to learning arrangements that imply instruction, the focus is on working forms of collaboration and co-construction and the provision of learning spaces for individual meaning and interpretation. The implementation of the courses makes use of, depending on the objectives, face-to-face teaching in block courses and digital learning platforms in the form of asynchronous and synchronous teaching.

Assessment

The successful participation in all courses as well as the implementation of a project, its scientific documentation in the form of a project paper and a defence of this project paper are included in the assessment.

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Internal Quality Assurance

All our teacher training courses are evaluated according to our Quality Assurance Plan. Participants will be asked to complete a survey after each semester, at the end of the course and one year after completion. These processes are controlled and monitored by our department for quality management. Our organisation is certified by the Agency for Quality Assurance and Accreditation (AQ A)

Besides this Internal Quality Assurance Plan there will be an Audit by nominated ECHA experts as suggested by the ECHA Guidelines.

Download the World Skills Lyon 2024

Physical education to support talented learners

There has been research made by different people and different organisations for different purposes, but we can see similarities in the results and outcomes. Physical education makes a difference in the results of the learning process. The researches we in this subchapter would like to lift up as examples is one Erasmus+ KA2 project, “Movement Improves Learning Experience in Schools”, and one book “The Mind-Body Method” by Dr Anders Hansen.

Movement Improves Learning Experience in Schools" (MILES)

The MILES project involved five schools from five different European countries, including Portugal, Spain, Turkey, Germany, and Italy and aimed to understand and implement the benefits of incorporating movement into the educational environment. During two years, from 2018 to 2020, learners aged 14 to 16 explored how physical activity and movement can be integrated into the learning process and measured how these activities could benefit not only physical health but also other subjects’ academic performance, using the Polar GoFit app and wearable sensors. The MILES project emphasised the use of technology, healthy lifestyles, and collaboration between schools.

Main goals:

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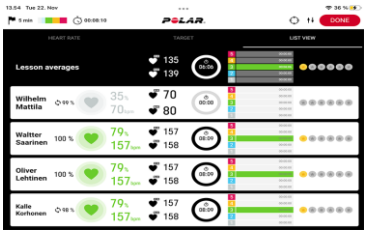
- ✓ Improve the learning process, healthy habits, well-being of the learners by increasing physical activity and sport during school time;
- ✓ Demonstrate that an increase in daily physical activity and movement in the classroom improves the physical and mental health of learners and has indirect repercussions on the whole school community; improves academic performance, reduces disciplinary incidences, and increases learners' attention, specifically regarding learners with a diagnosis of AD/H;
- ✓ Develop teacher training skills and exchange good practices regarding physical activity;
- ✓ Promote the partner schools' European development and widen the school's European contacts.

The programme incorporated daily aerobic exercise, the adjustment of the timetable to start with physical activity, the introduction of short breaks on the main subjects, for learners to move around the classroom (brain breaks), and the inclusion of sports activities during playground time. **As a result, academic development, learning experience, good habit,s and concentration in the classroom were substantially improved.**

The project had a webpage for activities and result dissemination, and was recognised with an e-Twinning award.

Focus on Healthy Habits: The project included workshops and activities focused on promoting healthy lifestyles, which are often linked to improved learning outcomes.



- ➢ **Technology Integration:** The project used technology to enhance learning experiences and facilitate collaboration among learners and teachers from different countries.
- ➢ **Cross-Cultural Exchange:** MILES also involved international mobility, allowing participants to share best practices and learn from diverse educational approaches.
- ➢ **Positive Impact:** Articles on the project note that MILES has demonstrated positive results and impact through its focus on innovation, integration, and collaboration.

The Mind-Body Method by Dr Anders Hansen

This book describes the connection between the physical moments and the function of the brain. For example, Dr Anders Hansen describes one test made in Sweden in two ordinary classes for the same age at the same primary school with similar learners and learner achievement. One of the classes had physical education classes every day for a longer period, the other class had only the ordinary, approximately 2 physical education classes per week. After the testing period was done, they could see a difference between the classes, the class with everyday exercises had better results in all subjects.

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Anders Hansen also talks about mental health in the book and how to use physical movement to feel better and to achieve different goals. One of the needs we see that talented learners can suffer from is mental illness. The Mind-Body Method gives the reader tools to get better mental health by physical movement.

Boost your talent

The objective of Boost Your Talent is to help young people in general, technical and vocational schools to know themselves better and develop entrepreneurial skills.

This programme offers schools various workshops in various formats, intended to strengthen the young people's self-confidence, their sense of responsibility, their creativity, etc. but also to raise their awareness of sustainable development and, more broadly, entrepreneurship.

A highlight of their programme is the Hackathon : a one-day challenge leading learners to respond to a problem under the sign of sustainable entrepreneurship of a Brussels organisation!

More info here : https://boostyourtalent.be/

Boost

We can be young, academically gifted and full of talent... but forbid ourselves from dreaming of higher education, a diploma, then an exciting job because life doesn't always give us the means.

Boost wants to offer young talents from weakened socio-economic backgrounds every chance to build a future that matches their motivation and potential. They do everything they can to maximize the chances of success of young people supported in higher education and facilitate their entry into the job market. To achieve this, their most powerful lever is the development of their talents.

The Boost programme takes place over a period of 6 years, in the form of individual coaching, group workshops, as well as material and financial support.

More info here : https://www.boostfortalents.be/

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Academy of Scientific Creativity and Innovation

Promoting Creativity and Innovation in Education

Introduction

In the spring of 2025, the University of Education Upper Austria launched the Academy of Scientific Creativity and Innovation (ASCI). This new institution aims to anchor scientific creativity and innovation in the educational landscape, thereby making a sustainable contribution to the quality and future viability of teaching.

Goals of the ASCI

The ASCI will act as an interface between science, educational practice and administration and address teachers as well as stakeholders of the education departments and the Ministry of Education through targeted programmes and further training initiatives. The aim is to not only promote the creativity of teachers through innovative teaching and learning methods, but also to actively involve learners in creative processes.

Core tasks of the ASCI

Further education and training for teachers

The ASCI offers practice-oriented further education and workshops on the programmes Scientific Creativity in Practice (SCIP) and Innovative FOCUS (InFOCUS). These programmes support teachers in integrating divergent thinking, problem-solving skills, and innovative spirit into their teaching.

Development of teaching materials

In collaboration with experts in didactics, teaching materials and concepts are developed that enable teachers to implement creative and sustainable educational projects in their classes.

Research and Evaluation

The ASCI will continuously research and develop the effectiveness of the programmes used. Research results will be presented in scientific publications and at specialist conferences to promote discourse on creative educational approaches.

Networking and Cooperation

The ASCI connects teachers, schools, and educational institutions to promote the exchange of best practices. In addition, collaboration with stakeholders from the education departments and the Ministry of Education is intensified to establish creative education as an integral part of the curriculum.

Learner Projects and Competitions

Projects and competitions give learners the opportunity to develop their own ideas and solutions to real-world problems. The goal is to inspire and support the next generation of creative and innovative thinkers.

Long-term vision: ASCI sees itself as a driver of sustainable change in the education landscape. By anchoring creative and innovative approaches in everyday school life, young people are empowered to tackle

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the challenges of the 21st century in an active and solution-oriented way. ASCI will be a key driving force in the education of the future.

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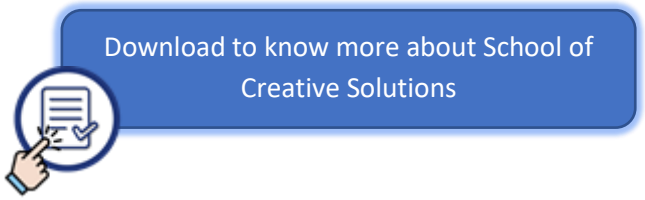

Culture and Art to support talented learners

Introduction

Culture and the arts play a vital role in supporting the development of talented learners. While talent is often identified through high performance in subjects such as mathematics or science or by being skillful handed in VET education. We can also se learners express their potential most naturally through creative, aesthetic or performative means. Educators who integrate arts and cultural education into their teaching provide additional possibilities for learners to explore their abilities, deepen their understanding and develop personal growth. The OECD (2019) has highlighted how arts education promotes creativity, inclusion and well-being, three essential components to support talented learners in a diverse and meaningful way. Even though the impact is great, the role of arts in talent development is still underrepresented or not cherished in many educational contexts. This section aims to highlight how music, theatre, dance, visual art and literature can serve as meaningful pathways for talented learners, encouraging creativity, critical thinking, emotional expression and interdisciplinary learning.

Culture and Art in a supportive way

Music

Music supports talented learners by offering a structure through which they can explore complex ideas and emotions. Learners who are musically inclined often demonstrate heightened sensitivity to sound, rhythm and composition and they benefit from opportunities to work creatively and analytically with musical forms. Music can also help develop cognitive abilities such as memory and to become more focused, innovative and creative.The Kennedy Centre for the Performing Arts provides educators with a wide range of tools for integrating music across subjects and learning levels, helping them recognise and cultivate musical talent in diverse classroom settings. When learners are encouraged to use music, they often tend to reach further in the tasks they have been given, dig deeper in the subjects and find innovative strategies. Schoolband First, a talent programme of Alfa-college in The Netherlands enhances academic competence from learners by given assignments as: analysing the structural form of the song (e.g. verse, chorus, bridge), to explain the chord progression and harmonic structure,to discuss the historical/cultural background of the song (e.g. soul music in the 1970s). And, if applicable, to make connections to societal themes (such as emotional expression or racial representation in music).

Drama and roleplaying techniques

Theatre encourages talented learners to engage both intellectually and emotionally. It provides a platform for role exploration, empathy and deep interpersonal reflection. Through performance, script writing

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or stage production, learners develop their communication and collaboration skills while also exploring abstract themes and ethical dilemmas. The European Network of Observatories in the Field of Arts and Cultural Education(ENO) has documented how theatrebased learning strengthens intercultural understanding and identity formation, supporting learners in navigating complex social contexts. For some learners, theatre becomes a means of exploring themselves and others through dialogue, embodiment and creativity.

Dance

Dance offers talented learners an embodied form of expression that combines discipline, emotion and innovation. Learners with a strong sense of movement and physical awareness often excel when they can explore ideas through choreography, improvisation or structured routines. Dance encourages awareness of space, timing and physical presence while also supporting mental focus and resilience. According to ENO, dance in education can promote inclusion and personal development, particularly when connected to broader themes such as culture, history or science. For talented learners, the ability to express meaning through movement offers a powerful complement to more traditional forms of communication. An example of a Dance Talent programme is Alfa's Dance Crew in The Netherlands (Alfa-college). Learners train the whole school year for the National MBO Dance Competition. They have an influence on the choreography and the music that will be demonstrated at the National competition. This programme offers learners the change to be challenged in a creative as well as physical way.

Visual Art

Visual art allows talented learners to communicate ideas, emotions and insights in ways that transcend spoken or written language. Through drawing, painting, sculpture, photography or digital media, they engage in observation, abstraction and experimentation. Visual art fosters aesthetic judgment, critical inquiry and risktaking, all of which are crucial for talent development. When combined with scientific or technical subjects, as in STEAM education, visual art helps learners build interdisciplinary thinking. EducationCloset advocates for arts integration as a way to make learning more inclusive and engaging, especially for learners who process information visually. In such contexts, art becomes a dynamic tool for exploration and innovation.

During the steering committee meetings across Europe we have been taking part of different exhibitions of visual art. Museums and galleries can also provide pedagogical workshops to learners and some also aim for the educators. These workshops are very inspiring and can be used as motivation and boost the talented learners. The pedagogical staff at the museums can also be working supportive to talented learners.

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In several countries the museums and pedagogical staff comes with a minor cost. If you want to explore visual art you can in many cities find sculptures in parks, street art or even exhibitions free of charge made outdoor in the city. During the steering committee meeting in Brussles we had the fantastic opportunity to take part in the visual art exhibition outdoor made with inspiration from the Belgium artist, René Magritte.

Literature

Literature offers talented learners a space for intellectual depth, personal reflection and emotional resonance. Reading and interpreting complex texts fosters imagination, critical reasoning and empathy. Many talented learners are drawn to layered narratives, symbolic language and ethical dilemmas found in literature. They thrive when given the opportunity to engage with diverse voices and global perspectives. Writing also becomes an essential mode of self expression, allowing learners to experiment with style, structure and voice. Both the OECD (2019) and ENO have emphasised the role of literature in building intercultural competence and promoting wellbeing. When educators offer space for literary exploration, they invite learners to think deeply about language, identity and make deeper reflections.

Stockholm School of Economics actively integrates art, fiction and poetry into its operations to broaden learners perspectives and promote creative thinking. This is done by introducing art into education, creating environments that promote reflection and offering activities such as book clubs.

Integrating culture and the arts into educational practice is a powerful way to support talented learners. These domains open up alternative paths for exploration and self expression, particularly for those whose talents may not be reflected in conventional academic measures. The arts foster curiosity, emotional depth, creativity and interdisciplinary insight, all of which are vital for developing young talent. Educators who value and incorporate the arts create richer, more inclusive environments where learners can discover their strengths and blossom. These artistic pathways align with the project's mission to promote inclusive, flexible methods that unlock every learner's unique potential.

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Chapter 7: Summary of key findings and outcomes

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The ***Educating Talents*** project has brought together a wide range of pedagogical approaches, practical strategies and systemic insights with the common goal of supporting talented and twice exceptional learners across European school systems. By analysing educational practices in varied cultural and institutional contexts, the project has demonstrated that talent development is not a separate track within education but a transversal perspective that can inform all aspects of school life and life. From educational and classroom methodologies to school leadership and from individualised support to international collaboration.

One of the key outcomes of the project is the development of a practical model that combines teachers' classroom observations with psychological assessments to help identify both talented and twice-exceptional learners. This educator-led observation and psychological diagnostics approach allows schools to recognise not only talented learners but also those whose potential may be masked by learning difficulties or socio-emotional challenges. Teachers and educators are encouraged to adopt a strength-based perspective, interpreting asynchronous development and behavioural signals through the lens of individual talent paths. When combined with formal cognitive diagnostics such as the AID-3 system and structured self-report tools, this approach ensures a broader, more equitable identification of learner potential.

The project has further emphasised that motivation, engagement and talent development are most effectively fostered through personalised and flexible learning environments. Pedagogical approaches such as Flex-Based Learning, Honors Pedagogies and the Kangaroo Method illustrate how individualisation can be implemented through differentiated tasks, autonomous learning pathways, and challenge-based activities. These methods place trust in the learner's ability to take initiative and encourage self-reflection, thereby cultivating not only subject-specific excellence but also transversal competences such as creativity, resilience and responsibility.

Other innovative methodologies tested during the project included the Case Methodology and the approach to Innovative Problem Solving. The Case Methodology enabled learners to tackle real-life, open-ended situations that required not only analytical thinking but also collaborative decision-making, a process which nurtured both cognitive flexibility and communication skills. Similarly, the Innovative Problem Solving model encouraged learners to engage with unfamiliar challenges creatively, often across disciplines, allowing them to construct original solutions and reflect critically on their own thinking processes. These approaches proved particularly effective in supporting talented learners who thrive in dynamic and problem-solving or question-based learning environments.

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At the same time, the project strongly reinforces the principle that inclusion and talent development are not mutually exclusive goals, but rather mutually reinforcing. Talented learners thrive when their unique profiles are seen, supported and celebrated. Inclusive practices were explored not only at the level of classroom differentiation but also through broader elements such as the development of a talent-oriented school climate, educators' attitudes towards diversity and school leadership strategies that enable pedagogical innovation. Particularly significant was the attention paid to twice exceptional learners, whose complex profiles often require bespoke solutions that integrate academic challenge with emotional and social support.

The practical implementation of the proposed pedagogical models during the project has led to observable benefits for both learners and educators. Across participating schools, methods such as Flex-Based Learning and Honors Pedagogies were associated with increased learner autonomy, motivation and willingness to take initiative. Teachers noted that when learners were given meaningful choices and structured challenges, their engagement deepened and their self-confidence improved. The Kangaroo Method, applied in mathematical contexts, was particularly effective in stimulating interest in complex problem-solving and promoting independent thinking. Initiatives such as Boost Your Talent and Mensa Youth provided opportunities for talent development in non-traditional settings and were positively evaluated by learners, who reported greater clarity in their educational goals and a stronger sense of being supported. Educators involved in these programmes also valued the chance to work more closely with learners' strengths and to reflect on how inclusive practices can be aligned with high expectations. These outcomes affirm the relevance and adaptability of the project's approaches and demonstrate their capacity to bring about meaningful educational experiences in diverse contexts.

Other ways to support talented learners are also practical advices to educators to support talented learners. For example, competitions, creative camps, collaboration with universities, or arts-based initiatives. The skillful handed can be promoted and supported by you by using Worldskills as a pedagogical tool. Talented learners regardless of talent can develop and reach further by physical education. Educators for the talented learner are very important in order to support the talented learner. We therefore also see a variety of networks that educators can use or use as good practice to create for the own school.

Another major outcome of the project is the emergence of a Community of Practice, a professional network in which educators, school leaders and external partners can exchange ideas, adapt successful practices and collaboratively advance the field of talent education. This community is not only national or institutional but explicitly transnational, reflecting the Erasmus+ spirit of shared responsibility and mutual enrichment. Through continuous cooperation, the Community of Practice enables the sustainability of the project's achievements and ensures that innovation remains embedded in everyday school practice.

The outcomes described in this eHandbook closely align with the original objectives of the *Educating Talents* project as stated in its foundational application. The development of a European-level pedagogical framework, the piloting of innovative practices, the creation of a transnational Community of Practice and the advancement of inclusive talent development models have all been successfully realised. Moreover, the intended impact has been observed: participating educators report greater confidence in recognising and supporting diverse talented learners potential, talented learners have demonstrated increased motivation and self-awareness and school environments have become more responsive to individual pathways. The eHandbook and the project thus delivers not only a set of resources but a tested and transferable model for sustainable educational innovation.

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What unites all contributions to this eHandbook is a shared belief: that talent exists in many forms and can emerge under the right conditions. The project does not promote one universal model, but rather offers a palette of tested approaches that educators can adapt to their specific contexts. Whether through enhanced observation, targeted support, pedagogical differentiation or enriched environments, the underlying aim remains the same, to empower all learners to grow towards their full potential.

The ***Educating Talents*** project stands not only as a collection of innovative practices but as a vision for education that is at once inclusive, aspirational and responsive to the complexity of human development.

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Legacy

This section outlines the planned follow-up activities and long-term impact of the project in each partner country. Even after the end of the funding period, partners remain committed to sustaining and further developing the project's results, methodologies and tools within their national contexts.

Austria

Educating Talents has a long lasting effect in the Upper Austrian school system. The models were integrated in a teacher training course at the pedagogical university of Upper Austria, starting in October 2025. At the same university a study course was set up – to train teachers to become specialists in the methods. These specialists then can implement a new subject in their schools. This programme has already started and is in its second year 2025/26.

The schools of the participating educators are model schools and help other institutions to implement the methods.

The eHandbook *Educating Talents* will be promoted by the Austrian ministry of education. Furthermore, the teachers' association for talented learners, in which all Austrian schools participate in, integrates the results of the project in teacher trainings.

Belgium

The Belgian team has successfully conducted one pilot-training and two training days, which have now been integrated into the official training catalogue. These initiatives have enabled the team to share and promote the project's methodology with a broader educational audience. A new school in Angleur has joined the initiative and is preparing to implement the case methodology in its pedagogical approach in September 2025. The team plans to continue disseminating the results of the project through additional professional development sessions and by promoting the use of the eHandbook within teacher networks and relevant educational institutions.

The eHandbook will be promoted in their network and on the website of the organisation. Associated partners are eagerly waiting for the final format of the eHandbook to share in their network too.

The eHanbook will be shared to all teachers that participated to the TLA.

France

The French Team shared the provisional results developed during the Educating Talents project with seven vocational and training organisations, nine secondary schools and two higher educational institutions offering teacher training courses. The feedback was used to fine tune and maximise the potential impact of our project results. All of the above organisations have confirmed that they plan to make use of the project results to improve the way they cater for talented learners and APRECA will accompany them through this process.

Firstly, we will translate all Educating Talents results into French and make them available to our network of partners in addition to the English versions. This includes all Educating Talents videos and of course the ehandbook.

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We will continue to use our communications tools (website, social media; communities of practice) and our network of partners to disseminate and promote the results. We will participate in sharing & promotion at local & regional, national and international levels. Through the positive reputation of the French partner & through the broad variety of their experience & background, a successful implementation of the project as well as an effective sharing & promotion at all levels will be ensured.

To achieve this goal the Educating Talents tangible results are optimally geared towards accomplishing sustainability & continuity of project results. The French partner will do their best to demonstrate that the activities proposed in the eHandbook are transferable & adaptable on different levels; & that will make a significant contribution to increasing the number of training providers that cater for the different needs of talented learners across Europe. In this way, the long-term usability of the results by external stakeholders will be guaranteed. This enables us to look forwards, confident in the knowledge that the sustainability of the project is guaranteed.

Latvia

As a follow-up to the Educating Talents project, RISEBA University of Applied Sciences is planning a set of awareness-raising and dissemination activities to ensure the continued visibility of the project outcomes within the national education context. Firstly, the digital version of the eHandbook – together with a short explanatory note in Latvian – will be shared with several leading institutions involved in teacher education in Latvia, including the University of Latvia, Liepāja University, and Daugavpils University. The goal is to promote academic interest in the topic of talent development and support the integration of selected project ideas into teacher training curricula. In parallel, a summary of the project's key findings will be submitted to the Ministry of Education and Science with a suggestion to consider the pedagogical models as part of future discussions on inclusive and differentiated learning strategies in general education. To reach a wider audience, a public information campaign is also being considered. This would include publishing a short article or interview on RISEBA's institutional website and social media platforms, highlighting the importance of recognising talented and twice-exceptional learners and informing educators, parents, and school administrators about the free resources developed by the project. These actions are intended to create further opportunities for dialogue, reflection, and exchange around the topic of talent education in Latvia and ensure that the outcomes of the project remain accessible and relevant beyond the formal funding period.

Netherlands

After the project ends we will try to add The Handbook in the digital Library of the National organisation MBOe. This organisation promotes talent education in Vocational education in the Netherlands. The digital Library of MBOe offers a lot of practical tools for teachers, our Handbook will be a rich addition to the library.

The contents of The Handbook will also be shared and promoted within our regional network Noorderkracht. In this network we work together with 4 vocational schools to exchange knowledge about talent education.

And of course The Handbook will be promoted within our own organisation to all teachers. Especially ofr our Excellence team of teachers the Handbook will help to enhance the quality of our excellence education.

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Sweden

Sjölins upper secondary schools will continue to aim for teacher development to support Talented Learners. All Sjölins schools will work deeper with the Case methodology and all teachers at every Sjölins school are implied to work with Case methodology. Since the digital eHandbook is published in english it can also be shared with dedicated persons at for example Harvard Business School. There is a wish that this eHandbook can be used as a complement or as a material for universities to share with their teacher education, in order to support teachers in an early stage of their education.

We have identified a largely unfilled gap in teacher training and in the academic education for teachers at universities and higher education, regarding meeting the needs of talented learners and twice exceptionals. With this in mind, we are considering applying for another KA2 project for call 2027. The KA2 cooperation partnership projects are huge as well as the workload therefore we aim to plan for the project for one year to be able to apply for it in call 2027.

Sjölins will distribute the eHandbook to all teachers, headmasters and staff for Sjölins Upper secondary schools. Sjölins belong to a group of 23 theoretical upper secondary schools in Sweden. The eHandbook will be translated into Swedish and shared with all the headmasters within this group for them to distribute the eHandbook to all persons working at their schools, approximately 700 teachers and staff.

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Description of Implementation and Experimentation

***Moana Widell**, M.A. Upper Secondary Education: focusing on Computer Science, Programming and Business Studies. B.A. in Informatics, specialization in Systems Architecture. Internationalisation Strategist at AcadeMedia's Theoretical Upper Secondary Schools. AcadeMedia, Stockholm, Sweden.*

TLA	Place & date	Main methods demonstrated	Key focus	Key outcomes
TLA 1	Groningen, Netherlands, April 2023	Honors Pedagogies, Flex-based Learning	How to recognise talented and twice exceptional learners	Teachers introduced to recognition tools and first testing plan
TLA 2	Brussels, Belgium, October 2023	Kangaroo Methodology, Motivation Through Individualization	Additional ways to motivate and support talented learners	Inspired new ideas for Chapter 6 on alternative support
TLA 3	Stockholm, Sweden, April 2024	Case Methodology	Applying practical cases in real classrooms	Local experimentation phase prepared
TLA 4	Austria, October 2024	Innovative Problem Solving, Motivation Through Individualization	Role of specialists and professionals in supporting learners	Finalization of methods and idea for Chapter 6 extension

The implementation and experimentation phase of the different methodologies and models followed a structured and collaborative approach. We had four Teaching and Learning Activities (TLA) during the project of Educating Talents. The first TLA took place in Groningen in the Netherlands in April 2023. In each TLA during the entire project we presented the method to the teachers on how to recognise talented and twice exceptional learners. This is the first step before you support a talented learner, therefore it was very crucial to present this to all educators.

In the TLA in the Netherlands Honors Pedagogies and Flex-based Learning were demonstrated. The second TLA was in Brussels in Belgium in October 2023. In Brussels the Kangaroo Methodology and Motivation Through Individualization was presented. During that meeting we also had the opportunity to get other inspiring ways to support talented learners. That is where the first thought of chapter 6 came, since there are many and a great variety of ways to support talented learners. The third TLA took place in Stockholm in Sweden. During that TLA the Case Methodology was presented. At the final fourth TLA in Austria the Innovative Problem Solving and Motivation Through Individualization were presented. We saw how different persons and professionals can be supporting the talented learners and therefore we decided during that TLA to add chapter 6 "How to support talented learners in other ways". At every TLA we were involving both

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specialist authors and participating educators from the partner countries. The aim was to translate theoretical concepts into practical methods and gather real tested feedback for refinement.

All participating educators were introduced to the project's theoretical foundation during the Transnational Learning Activity (TLA), where they engaged with the central concepts and initial drafts of the methodology. These sessions were led by the project's specialists and served as a foundation for later experimentation.

After each TLA, the educators returned to their respective countries to test the proposed methodology or model in their local classroom environments. This testing phase formed the core of the project's experimentation effort. Educators were encouraged to apply the methods flexibly within their subject areas and national contexts, documenting how learners responded and how the methods worked in practice.

Following the experimentation period that lasted for 3-6 months depending on the methodologies that were tested, feedback was collected through a series of structured digital follow up meetings. These included Zoom meetings, digital conferences, written exchanges via email and phone calls. During these sessions, educators shared their observations, challenges, and suggestions for improvement. This feedback loop was a part of creating the final version of the methodology.

The participating educators completed a comprehensive questionnaire after the classroom implementation phase. The questionnaire was designed to capture both the educators and learners experiences, offering insights into the emotional, pedagogical and practical impact of the methodologies. The responses provided valuable qualitative and quantitative data, which directly gave the specialists information that could contribute to the writing of the subchapters "How do the learners feel about it?" and "How do the educators feel about it?" in this eHandbook.

This iterative process, from theory to practice, feedback and refinement, ensured that the final outputs were grounded in classroom reality and supported by a wide range of experiences across different educational systems. The collaborative implementation phase gave a great link and bridge between the conceptual model and its practical, tested version in diverse European classrooms.

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Acknowledgments

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SC1 Thonon, FR


SC2 Windischgarsten, AT


SC3 Groningen, NL


SC4 Brussels, BE


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SC6 Linz, AT


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SC8 Stockholm, SE

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