STEAM STARS

A European Framework of Competencies in teaching STEAM education for gifted students

2019-1-UK01-KA201-061537

Training Modules

STEAM Stars Open Campus

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Table of Contents

INTRODUCTION **4**
The Training Modules 4
1. FOUNDATIONS OF GIFTED EDUCATION **5**
Aims of the Learning Unit 5
Description 5
Methodology 8
Assessment 8
Tips for educators 9
References 9
Practical Activities for Learning Unit 1 9
2. EDUCATIONAL NEEDS OF GIFTED STUDENTS **12**
Aims of the Learning Unit 12
Description 12
Methodology 14
Assessment 14
Tips for educators 14
References 15
Practical Activities for Learning Unit 2 16
3. CURRICULUM PLANNING FOR GIFTED STUDENTS **20**
Aims of the Learning Unit 20
Suggested contents 20
Methodology 22
Assessment 23
Tips for educators 23
References 24
Practical Activities for Learning Unit 3 24
4. LEARNING ENVIRONMENTS FOR GIFTED INSTRUCTION **27**
Aims of the Learning Unit 27
Description 27
Methodology 28
Assessment 29
Tips for educators 29
References 30
Practical Activities 30

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5. TEACHING BASIC SKILLS TO GIFTED STUDENTS THROUGH STEAM EDUCATION 35

AIMS OF THE LEARNING UNIT 35

DESCRIPTION 35

METHODOLOGY 39

ASSESSMENT 39

TIPS FOR EDUCATORS 40

REFERENCES 40

PRACTICAL ACTIVITIES 41

6. INSTRUCTIONAL DESIGN OF STEAM FOR GIFTED STUDENTS 44

AIMS OF THE LEARNING UNIT 44

DESCRIPTION 44

METHODOLOGY 45

ASSESSMENT 46

TIPS FOR EDUCATORS 46

REFERENCES 46

PRACTICAL ACTIVITIES 47

7. IMPLEMENTATION OF STEAM EDUCATION FOR GIFTED STUDENTS 54

AIMS OF THE LEARNING UNIT 54

DESCRIPTION 54

METHODOLOGY 55

ASSESSMENT 55

TIPS FOR EDUCATORS 56

REFERENCES 56

PRACTICAL ACTIVITIES 57

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INTRODUCTION

The STEAM Stars project aims to design a European Framework of Competences in teaching STEAM gifted education, promoting innovative methods and pedagogies targeting gifted students, and developing OER digital learning materials and tools in STEAM gifted education. The expected long-term impact of the project will be the strengthening of the school education system in Europe.

These Training Modules have been elaborated as part of the implementation process of the STEAM Stars project (No. 2019-1-UK01-KA201-061537) – a project funded by the European Commission under the Erasmus+ Programme: Strategic Partnerships for school education.

The STEAM Stars project team includes professionals from seven organizations, including universities, education authorities and education experts, from five countries. The coordinator, Coventry University, is in the UK, and the partners are: INFODEF and Zabala in Spain, the Rotterdam University of Applied Sciences in The Netherlands, Dokuz Eylul University of Izmir and the Ministry of Education General Directorate of Special Education and Guidance Services from Turkey, and Innoquality Systems from Ireland.

The Training Modules are part of the **STEAM Stars Open Campus,** which includes three elements:

1. **Online Instructional Guide on Digital Competences for Virtual Learning:** Designed to improve the digital skills and facilitate the interaction with virtual learning environments of schoolteachers, trainers, and non-formal and informal educators.
2. **Training Modules:** A structured set of innovative training content and practical activities for teaching STEAM education to gifted students, developed on the basis of the European Framework of Competences (Output 1 of the project). This has been designed as a pedagogical tool providing a selection of materials with which schoolteachers, trainers and non-formal and informal educators can work to develop and implement the European Framework of Competences.
3. **MOOC courses on Teaching STEAM Education to Gifted Students:** Massive Open Online Courses developed on the basis of the European Framework of Competences and the Training Modules.

The Training Modules

The Training Modules follow the structure set out in the European Framework of Competences on teaching STEAM education for gifted students (Output 1 of the STEAM Stars project):

1. Foundations of gifted education
2. Educational needs of gifted students
3. Curriculum planning for gifted students

4. Learning environments for gifted instruction
5. Teaching basic skills to gifted students through STEAM education
6. Instructional design of STEAM for gifted students
7. Implementation of STEAM education for gifted students

1. FOUNDATIONS OF GIFTED EDUCATION

Aims of the Learning Unit

The aim of this learning unit is to introduce the concepts of STEAM education and gifted learning. The unit introduces the course as a whole, and sets up the theoretical framework for understanding gifted education in the context of STEAM. It also allows participants to reflect on their existing experience and knowledge of giftedness and how it presents within education.

Description

Gifted students (also known as gifted and talented, high-achieving, or high-ability students) have been a specific focus of education for thousands of years. The provision of specialised education for young people exhibiting high levels of intellect or creativity was argued by Plato and has continued to exist throughout the world.

Gifted education seeks to meet the various requirements of students who have been identified as gifted, usually by providing additional learning materials which allow them to go deeper into the subject or to move ahead of their classmates. However, most gifted children spend the majority of their time in regular classrooms without access to challenging coursework or to teachers who are knowledgeable about the special learning needs of our most highly able learners. That is the reality in countries such as the United Kingdom, Ireland, Spain, the Netherlands and Turkey.

STEAM education combines the knowledge and skills of the 'hard sciences' with those of the arts. By doing so it facilitates creativity, critical thinking, problem solving and collaboration in the classroom – competences which are particularly useful in providing a positive educational environment for gifted students.

Module 1: Introduction to STEAM and Gifted Education

- An introduction to STEAM education
- Examples of STEAM activities
- Introduction to gifted education

This module focuses on developing an understanding of the concept of STEAM and how it can be applied to gifted education. STEAM adds the Arts into the theory of STEM education, which

has been a focus of education policy for years, as a result of its implications for the economic success of a country.

STEM refers to:

- Science
- Technology
- Engineering; and
- Maths.

According to The Institute for Arts Integration and STEAM in the USA, "STEAM Education is an approach to learning that uses Science, Technology, Engineering, the Arts and Mathematics as access points for guiding student inquiry, dialogue, and critical thinking."

This course focuses on approaches to gifted education in the context of STEAM, drawing on ways in which the integration of arts inquiry and critical thinking can inform and extend teaching and learning of gifted children in STEM.

The STEAM approach to education takes many forms, but above all is rooted in collaborative practice across disciplines. For example, collaborative projects that focus on building project management and team skills in the context of a STEM activity could be considered an example of STEAM education. The focus then is on combining the experiential approach of STEM with the critical thinking, collaboration, and creativity of the arts and humanities.

Module 2: Definitions and Characteristics of Giftedness

- How gifted children manage relationships and emotions
- Ways in which gifted children present themselves
- Why gifted children do not always meet their potential

The concept of giftedness has evolved over time and has been theorised in multiple ways. Initially the focus was on exceptionality as evidenced by actions or achievements, as in the case of Albert Einstein and Thomas Edison. Neither of these men were able to excel in a traditional schooling environment, and yet they demonstrated exceptional talents and abilities in their working lives.

While there are many theories of gifted education, it is important to acknowledge that all gifted children are different and while the theories presented may account for different presentations of giftedness, they are not exhaustive.

The characteristics of gifted students can be a useful lens through which to focus expectations; in many cases these individuals have needs and traits which teachers must recognise and understand in order to support and challenge them.

Betts and Neihart (1988) developed six profiles of gifted and talented children, based on observation, interviews, and literature reviews. They created a matrix to assist parents, teachers, and other relevant adults to understand the nature and needs of those six types of young people, and to enable them to identify the different ways in which gifted children present.

The six profiles identified by Betts and Neihart are:

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- Successful ("plays the game"; works with the system; might be (seen as) lazy because they don't have to try too hard)
- Challenging (divergently gifted; difficult to identify; often questioning of authority, and disruptive)
- Underground (denies their talent)
- Dropouts (angry; rejected; resentful)
- Double-labelled (has a physical/emotional/learning disability; talent can be hard to identify as a result) (also known as twice-exceptional)
- Autonomous Learner (self-facilitator; uses the system; successful).

These profiles are addressed further in later training modules.

Module 3: Gifted Children in the Classroom

- Supporting gifted students in the classroom
- An introduction to twice-exceptional children
- Teaching gifted children – strategies and challenges

This lesson focuses on different ways to offer gifted children the opportunity of an exceptional educational experience in the classroom. For this, we will be looking at how to recognise previously unrecognised giftedness and how to address possible challenges for teachers.

Carol Ann Tomlinson has developed some important general aspects that can be useful when engaging with teaching gifted children:

- Develop a good curriculum and instructions: make sure that the learning material is engaging and that it contains stimulating tasks that push gifted children to address meaningful problems and come up with solutions that are relevant for their lives. Offer both a good structure of the material – organised around key concepts and principles – as well as choice on tasks to complete.
- Adjust the pace of the instructions to the student's needs: most gifted students learn successfully at an accelerated pace, but sometimes slowing the pace of the instructions might be useful to allow more depth of engagement with the topic.
- Provide a "higher degree of difficulty" for gifted learners: educational materials whose "content, processes and products should be more complex, more abstract, more open-ended, more multifaceted" (Tomlinson, 1997).
- Understand "supported risk": gifted children might be overachievers who have rarely failed academically. When exposing them to customised challenging educational material, support them in their growth by making them feel safe in taking risks and making mistakes.

As an educator, it might sometimes be difficult to identify previously unrecognised giftedness for different reasons. For example, gifted students are disproportionately introverts: "otherwise a minority in the regular population but a majority in the gifted population" (Burruss & Kaenzig, 1999). Furthermore, giftedness can be accompanied by a learning or developmental disorder, like ADD, ADHD, dyscalculia, dyslexia or ASS, in which case the pupil is called "twice-exceptional." It is important to recognise the above in order to fully develop the educational potential of the gifted student.

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One of the main challenges for teachers of gifted children is that they rarely receive specific training on how to adapt the traditional pedagogic model to incorporating methods that can encourage the development of giftedness. Charles Pope Rossier, an experienced teacher of gifted students, suggested some successful methods for engaging high-achieving students:

- Offering a greater amount of subject matter with greater depth.
- Considering the students' higher perception, empathy and more mature emotional response.
- Incorporating the students' feedback and giving them mastery over designing bits of teaching material.
- Designing activities for students to contribute and practice their critical thinking in the classroom.

Methodology

You could use the STEAM education model and/or challenge-based learning to develop a project for interdisciplinary teams of mixed ability to work on, allowing sufficient scope for gifted children to extend the exercise. The brief for the challenge project should be broad enough to allow out of the box thinking but provide sufficient detail for all students to attain well.

You should consider the following:

- Your understanding of the STEAM education model
- How it could be applied in your discipline
- An example of how it could be used

Work with the learners over a period of time, working through each step in the STEAM model. A good timescale is 4 to 6 weeks during which learners develop a prototype relevant to the subject/ discipline. For example, a weather balloon, a mobile app, or a short film.

Remember that learning designs in classrooms which include gifted students should engage and challenge all of the learners, without alienating those who are not identified as being gifted.

Assessment

When assessing gifted students, they should be given the opportunity to present their project work, receive feedback and refine the version for assessment. The criteria for assessment could encompass originality and creativity, application of subject knowledge, teamwork and leadership, project management, and other relevant skills.

At the end of this Learning Unit, you should have a basic understanding of what constitutes STEAM education and the theories behind gifted education. You will have an awareness of the different ways in which gifted children can present in the classroom, the reasons why they may not engage or perform at a high level, and some characteristics of giftedness. This knowledge will be expanded by the following modules within this course.

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Tips for educators

Teamwork may be challenging for gifted children, especially if they feel that team members are not able to understand their concepts or work at their expected level. Build in opportunities for gifted children to reflect on how they work in teams and highlight the strengths of team members.

References

Institute of Arts Integration and STEAM. 2021. What is STEAM education?

Dodge, A. 2018. STEAM in Every Subject: 10 Examples of Collaborative Learning

Betts, G.T. and Neihart, M. (1988) 'Profiles of the Gifted and Talented'. Gifted Child Quarterly [online] 32 (2), 248-253. DOI: 10.1177/001698628803200202

Cross, T. L. (2014) 'Social Emotional Needs: The Effects of Educational Malnourishment on the Psychological Well-Being of Gifted Students'. Gifted Child Today 37 (4), 264-265

Kanevsky, L. and Keighley, T. (2003) 'To produce or not to produce? Understanding boredom and the honour in underachievement'. Roeper Review [online] 26 (1), 20-28. DOI: 10.1080/02783190309554235

Reid, E. and Horváthová, B. (2016) 'Teacher Training Programs for Gifted Education with Focus on Sustainability'. Journal of Teacher Education for Sustainability [online] 18 (2), 66-74. DOI: 10.1515/jtes-2016-0015

Roeper, A. (1982) 'How the Gifted Cope with Their Emotions'. The Roeper Review [online] 5 (2), 21-24. available from <http://www.positivedisintegration.com/Roeper1982.pdf> [9 May 2020]

Rossier, C. P. (1959) 'Teaching English to Gifted Students'. The Clearing House [online] 33 (7), 415-417. available from [12 May 2020]

Schneider, M (2015, 5 January) *6 Types of Giftedness* [online] available from <https://upcoaching.nl/6-types-giftedness/> [8 May 2020]

Tomlinson, C.A. (1997) What it Means to Teach Gifted Learners Well | National Association for Gifted Children (nagc.org)

Practical Activities for Learning Unit 1

Activity 1

Name of the Activity
Understanding your experience of giftedness
Aims of the Activity

The aim of this activity is to develop a context for the discussion of giftedness, drawing on your experience of giftedness and to connect this to others' experiences in order to establish understanding of giftedness in its broadest manifestations.
Description of the Activity
Drawing on your own experience of teaching and engaging with gifted children, respond to the prompts below. Reflect on any teaching and learning engagements you have had with gifted children in the past. The focus is on understanding your own experiences and how giftedness has manifested in different ways in and beyond the classroom. You should also comment on the responses of your peers and engage in a discussion with them to build your understanding and share knowledge. Prompts: • What are the characteristics of gifted children, in your experience? • How has giftedness manifested differently in different children? • What challenges have you faced in extending or enriching the curriculum for gifted children?
Resources
Institute of Arts Integration and STEAM. 2021. What is STEAM education? https://artsintegration.com/what-is-steam-education-in-k-12-schools/#steammodel Dodge, A. 2018. STEAM in Every Subject: 10 Examples of Collaborative Learning. https://ozobot.com/blog/steam-in-every-subject-10-examples-of-collaborative-learning Betts, G.T. and Neihart, M. (1988) 'Profiles of the Gifted and Talented'. Gifted Child Quarterly [online] 32 (2), 248-253. DOI: 10.1177/001698628803200202 Schneider, M (2015, 5 January) 6 Types of Giftedness [online] available from https://upcoaching.nl/6-types-giftedness/ [8 May 2020]
To find out more
The Institute of Arts Integration and STEAM **https://artsintegration.com/**

Activity 2

Name of the Activity
Twice-Exceptional Children
Aims of the Activity
The aim of this reflection exercise is to develop reflective practice around approaches to gifted education towards twice-exceptional children.
Description of the Activity
Read the article titled Characteristics of Twice Exceptional (2e) Children. Think about whether you've encountered these characteristics within your educational practice and on how you can best identify when you're teaching a twice exceptional child.
Resources
Kanevsky, L. and Keighley, T. (2003) 'To produce or not to produce? Understanding boredom and the honour in underachievement'. Roeper Review [online] 26 (1), 20-28. DOI: 10.1080/02783190309554235 Rossier, C. P. (1959) 'Teaching English to Gifted Students'. The Clearing House [online] 33 (7), 415-417. available from https://www.jstor.org/stable/30190933 [12 May 2020]
To find out more

https://medium.com/@bigmindsunschool/characteristics-of-2e-children-5ad7d3c91c38

2. EDUCATIONAL NEEDS OF GIFTED STUDENTS

Aims of the Learning Unit

This learning unit provides an overview of learning characteristics and personality traits of gifted students, and of their educational needs. It aims to increase the knowledge of the various manifestations of giftedness and to train teachers to recognise the educational needs of gifted students in order to meet their need for challenge, coaching and guidance.

Knowledge of the educational, social and emotional needs, the common characteristics, and the common misconceptions about gifted students is a requirement to optimally coach and guide them in their personal, cognitive, social, psychological and emotional development.

In this unit you will also learn in what ways poor self-image and self-insight plays a role in the learning outcomes of the gifted underachievers. Since there are many reasons and solutions for underachievement, teachers have to know where to pay attention, in particular because solutions always start with the attention of the teacher.

Description

Common stereotypes & traits

In this training you will acquire knowledge related to the variety of personal characteristics possessed by gifted students, and different ways to meet their educational needs. Many gifted children will show themselves as highly autonomous and eager learners (Van Gerven, 2008). Their motivation for learning can be extremely high when it is intrinsic. When it's not, they can become demotivated, which can lead to bad school results and underachievement (Kieboom, 2015). We look at the development of gifted students from a holistic perspective with attention to their feelings, behaviour and needs. As described in Unit 1, Betts and Neihart (2010) have defined six profiles of gifted students based on scientific research. These profiles (*see MOOC "Common Stereotypes & Common Traits")* give a theoretical insight into what can be needed to facilitate personal growth. They can also help to identify the profiles on a behavioural level.

It is important to realize that there are no students that will fit completely within one of these profiles, which are composed to embody six average 'stereotypes'. Since every gifted student is different, it is helpful to explore the personal characteristics and learning properties, the background, educational needs, family and school environment.

"The results of studies assessing the measurement of intelligence show that IQ is distributed in the population in the form of a Normal Distribution (or bell curve), which is the pattern of scores usually observed in a variable that clusters around its average. In a normal distribution, the bulk of the scores fall toward the middle, with many fewer scores falling at the extremes. The normal distribution of intelligence [*see MOOC "Common Stereotypes & Common Traits"*] shows that on IQ tests, as well as on most other measures, the majority of people cluster around the average (in this case, where IQ = 100), and fewer are either very smart or very dull. Because the standard deviation of an IQ test is about 15, this means that about 2% of people score above an IQ of 130, often considered the threshold for giftedness, and about

the same percentage score below an IQ of 70, often being considered the threshold for an intellectual disability." (Source: https://courses.lumenlearning.com/suny-lifespandevelopment/chapter/extremes-of-intelligence-intellectual-disability-and-giftedness/)

A gifted student is not only defined by their IQ score. According to the Delphi model (Kooijman, 2008) (*see MOOC "Common Stereotypes & Common Traits"*), gifted people can be described as follows: "A gifted person is a fast and clever thinker who is able to handle complex matters. Is autonomous, curious and driven by nature. At the same time also a sensitive and emotional person, who lives intense and enjoys creating things, finds different solutions or unusual ideas".

The Delphi model describes the interaction of the gifted person with society as creative, quick, intense, and complex. It emphasizes the mutual influence of all the mentioned facets. And where the model on the one hand focusses on the positive sides of giftedness, the qualities and opportunities, it also shows where and why gifted people often clash with their environment. According to the 'Delphi-thinkers', giftedness is more than having a good set of brains; it is the intensity and sensitivity, a strong sense of justice, curiosity and creativity in thinking that are the core of the gifted 'being'.

This training will help you to understand that the population of gifted students is heterogeneous, as gifted students are easily stereotyped in an incorrect way.

Social & emotional needs

In this training you will learn to understand the social and emotional needs of gifted students, by working with validated and correct diagnoses, by recognizing their behaviour, needs, feelings and attitudes, in order to meet the social, emotional and educational needs of gifted students.

Creating a learning environment to stimulate gifted students on their personal, cognitive, social, psychological and emotional development, while avoiding stereotyping and misconceptions, will be the focus in this training.

Underachievement & twice exceptional

Poor self-image and self-insight, together with the purpose of specific behaviour, are the main causes of underachievement. In this training you will learn how to recognise underachievement.

When giftedness is accompanied with a learning or developmental disorder (for example ADD, ADHD, dyscalculia, dyslexia or ASS), this is called 'twice-exceptional' and needs special attention from the teacher.

When teachers are able to recognise the above-mentioned in educational practice, they will become better coaches and bring gifted students to their full potential.

Gifted students need the guidance of a teacher that recognises them for what they are.

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Sometimes making educational adjustments for the above types of gifted students - underachieving or twice-exceptional - will help them to exceed their own expectations (see Unit 3).

Methodology

Learning Unit 2 teaches how to recognise gifted children. It gives an overview of learning characteristics and personality traits of gifted students and their educational needs. Through these modules you will increase the knowledge of the various manifestations of giftedness and learn to recognise the educational needs of gifted students in order to meet their need for challenge, coaching and guidance.

Putting this into practice is an ongoing process. It takes time to transfer theoretical knowledge to the classroom. This training offers different approaches:

- Source research: read literature, books and articles about gifted students.
- Inquiry based science education: an investigative approach to teaching and learning where students are provided with opportunities to investigate a problem, search for possible solutions, make observations, ask questions, test out ideas, and think creatively and use their intuition.
- Discussion and interaction: talk with colleagues, experts, students, their parents and teachers to track down challenges.

Assessment

At the end of this Learning Unit you should have a basic understanding of the needs of gifted students, their learning characteristics and personality traits, and different manifestations of giftedness.

You will become aware of the various ways in which gifted children can present themselves in the classroom, the reasons why they may not be engaged and why they might not perform at a high level. You will learn to encourage your students in their abilities to learn and apply new skills and insights. You will be able to show your students new options and make them eager to explore further.

This knowledge will be expanded by other modules within this course.

Tips for educators

From the variety of theories about giftedness, this small selection can help in the recognition of gifted students, and create awareness about giftedness.

Six profiles of giftedness, by Betts & Neihart

Betts & Neihart (2010) presented six different profiles of gifted and talented students. This presentation provides information for educators and parents about the behaviour, feelings,

and needs of gifted and talented children and youth, and gives options of how to support them.

Delphimodel

According to the Delphimodel (2007), a gifted person is a fast and clever thinker (to think) who is able to handle complex matters. Their thinking process is supported by characteristics such as: autonomy (to be), curiosity and driven by nature (to want), highly sensitive (to perceive) and richly varied emotions (to feel).

Self Determination Theory (Ryan & Deci)

According to the Self Determination Theory of Ryan & Deci (1985) there are three psychological needs (autonomy, competence, relatedness) that are universally important for psychological wellbeing and autonomous motivation.

Taxonomy of Bloom

The revised version of Bloom's taxonomy (2001) ranks thinking skills from low to high according to complexity and energy: the more complex a task, the higher the required thinking skills. Gifted people can be recognised by their high(er) thinking skills.

Being-factor from Tessa Kieboom

According to Kieboom (2012), giftedness has two distinguishing factors: a cognitive factor (the thinking part) and a being-factor (the being part). It is the being-factor that determines these characteristics of gifted individuals: automatic setting of a high bar, critical attitude, great sense of justice and sensitivity. As the potential is higher, there also is a higher and stronger consciousness.

Conclusion: The difference in theories indicates how heterogeneous the group of gifted students is: every student has different characteristics and learning properties. They are in different classrooms, with different teachers, and have different parents, so the educational needs that individual gifted students have are also divergent.

References

Betts, T. G., & Neihart, M. (1988). Profiles of the Gifted and Talented. Gifted Child Quarterly, 32(2), 248-253.

Betts, T. G., & Neihart, M. (2010). Revised profiles of the gifted and talented. Geraadpleegd van http://ingeniosus.net/wp-content/uploads/2010/11/PROFILES-BESTREVISED-MATRIX-2010.pdf

Gerven, L. van (2008). Slim Beleid; Keuzes en consequenties bij beleidsvorming ten behoeve van hoogbegaafde leerlingen in het basisonderwijs. Assen, NL: Koninklijke Van Gorcum.

Gerven, L. van (2011). Handboek hoogbegaafdheid. Assen, NL: Koninklijke Van Gorcum

Kieboom, T. (2012). Jij kan beter. Als je kind een onderpresteerder is. Antwerpen: Witsand Uitgevers.

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Kooijman-van Thiel, M.B.G.M. red. (2008). Hoogbegaafd. Dat zie je zó! Over zelfbeeld en imago van hoogbegaafden. Ede, NL: OYA Productions.

Practical Activities for Learning Unit 2

Activity 1

Name of the Activity
Recognizing different profiles of giftedness
Aims of the Activity
The main aim of this activity is to learn how to recognise gifted students and the differences between them. The six profiles developed by Betts and Neihart (2010) will be used as a theoretical base.
Description of the Activity
Duration: Up to 3 hours. People in group: 2-4 people. 1. Read the descriptions of the six profiles of Betts & Neihart (2010) In the added poster you can see and read what personal characteristics and learning properties fit the profiles: https://talentstimuleren.nl/?file=7484&m=1507559574&action=file.download 2. Read the theory about gifted students: https://www.wur.nl/en/Education-Programmes/Current-Students/Giftedness.htm 3. Choose one profile and create a student that fits this profile: age, place of residence, parents, hobbies, sports, personal characteristics, learning properties, etc. Present this fictitious student to your group and let them guess which profile the student fits. Discussion: • What are the strengths of this student? • Which challenges might this student have? Try to recognise differences and similarities with your own students and discuss this in your group. What revelations did you experience?
Resources
White board, paper, internet; multimedia.
To find out more
For a brief overview of the six profiles: https://talentstimuleren.nl/?file=7484&m=1507559574&action=file.download https://talentstimuleren.nl/?file=553&m=1370389145&action=file.download RITHA | Radboud International Training on High Ability – - YouTube https://talentstimuleren.nl/?file=553&m=1370389145&action=file.download https://talentstimuleren.nl/?file=7484&m=1507559574&action=file.download https://courses.lumenlearning.com/suny-lifespandevelopment/chapter/extremes-of-intelligence-intellectual-disability-and-giftedness/ https://www.wur.nl/en/Education-Programmes/Current-Students/Giftedness.htm https://www.wur.nl/en/Education-Programmes/Current-Students/Giftedness.htm

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Activity 2

Name of the Activity
Social and emotional needs
Aims of the Activity
The main aim of this activity is to learn how to recognise the learning characteristics and personality traits of gifted students, and particularly the social and emotional needs they may have.
Description of the Activity
Duration: Up to 3 hours. People in group: 2-4 people. 1. Read both articles: "How can you build on your talents?" by Desiree Houkema (2017) and "Building gifts into talents: Brief overview of the DMGT 2.0" from Gagné (2009) 2. Read the two cases below and try to determine what learning characteristics and personality traits these students show. 3. Find out or discuss with your group what you recognised in the text, and write down the questions you have about the student. **Case 1: Mo** Mo is a 5 years old child who loves to play with Lego and cars. He also draws a lot of pictures of fantasy animals. He's very creative and experiments with different materials to draw with. At home he already reads simple children's books, he can count to 100 and make easy calculations. He has one best friend in his class, and he loves to play with him at home. His parents experience him as a happy child who is eager to learn new things. His teacher sees a very quiet child, which does not want to play with other children and does not talk at all. He does everything the teacher asks him to do, but he doesn't seem to like being at school. **Task:** Please find out or discuss with your group: What questions would you raise if you were Mo's teacher? What do you think is a good way to approach Mo? Which characteristics do you recognise? **Case 2: Lisa** Lisa is a cheerful and sensitive 11 year-old girl, who loves to dance and sing, and makes lots of TikTok videos. She is very creative and edits them all by herself, watching and learning from other TikTokkers. Lisa is a very quick thinker, inventive and verbally strong. Both at home and at school she is sensitive and always involved with the people around her. She keeps an eye on everything and everyone and has high self-awareness. In her class she often plays with five other girls, but they also argue and gossip a lot. It sometimes makes her a bit insecure and sad. Lisa is in her final class of elementary school. At the end of the winter she has to decide which school she will attend: she likes school, but she's not interested in any specific subject. Languages are easy for her, but Maths is hard. She doesn't like it when it gets harder and she has to work through methods, learn tactics and do exercises. Due to demotivation she has built up a backlog in Maths. Her results in national tests are very divergent: language skills show extreme high results. Mathematics shows very low results. Her teacher is not sure what to advise when it comes to the level of further education. **Task:** Please find out or discuss with your group: What would you do or advise, if you were Lisa's teacher? Do you recognise the personal traits of Lisa? What could be the educational needs of Lisa in your opinion?
Resources
White board, paper, internet; multimedia.

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To find out more
"How can you build on your talents?" by Desiree Houkema (2017) https://talentstimuleren.nl/?file=7298&m=1500732382&action=file.download Gagne, the Differentiated Model of Giftedness and Talent (DMGT) https://www.researchgate.net/publication/287583969_Building_gifts_into_talents_Detailed_overview_of_the_DMGT_20 For a brief overview of the six profiles: https://talentstimuleren.nl/?file=7484&m=1507559574&action=file.download https://talentstimuleren.nl/?file=553&m=1370389145&action=file.download

Activity 3

Name of the Activity
Underachievement & Twice Exceptional
Aims of the Activity
The main aim of this activity is to learn how to recognise the learning characteristics and personality traits of gifted students, in particular students who are underachievers and/or are twice exceptional.
Description of the Activity
Duration: Up to 3 hours. People in group: 2-4 people. Read both articles: "How can you build on your talents?" by Desiree Houkema (2017) and "Building gifts into talents: Brief overview of the DMGT 2.0" from Gagné (2009). Read the two cases below and try to determine which learning characteristics and personality traits these students show. Find out or discuss with your group what you recognised in the text and write down the questions you have about the student. **Case 3: Amira** Amira is a gifted 15 year-old girl who loves sport; football, running and free running are her favourites. In the weekends she often takes part in competitions and sometimes she wins. She plays the guitar and piano and sings in a choir. She has a lot of friends and loves to hang around with them. School goes well as she doesn't have to work hard to get acceptable grades, and she hardly ever does her homework. In class she's easily distracted. It's hard for Amira to complete a task, or to concentrate for more than approximately 5 minutes. She seems happy and relaxed in class. And she says she likes to go to school. **Task:** Please find out or discuss with your group what traits you recognise in Amira. Firstly, think of what issues she has to deal with. In what way can you help Amira? What would you ask her, in order to figure out what her needs are? **Case 4: Jack**

Jack (19 years old) studies at a technical university. He is in his third year of study, has good results, and is a board member of the technical student association. Jack lives with three other technical students in a student house, where he maintains contact with the landlord on behalf of the inmates. Since Jack has been studying, his life has changed: in primary and secondary education he had (almost) no friends, and he felt lonely, misunderstood and 'different'. Since he started his studies, he feels happy and comfortable, and understood and appreciated in his environment. As feedback on his technical internship (in business), Jack was highly praised for the content of his assignment, and he received this feedback from his mentor: “It would be helpful for you to work on your social skills.”

Task: Discuss and research with your group how Jack could have been helped, during his primary and secondary school, so he would have started to blossom at an earlier stage in his life. What is the reason Jack feels so comfortable now?

Resources

White board, paper, internet; multimedia.

To find out more

“How can you build on your talents?” by Desiree Houkema (2017)

https://talentstimuleren.nl/?file=7298&m=1500732382&action=file.download

Gagne, the Differentiated Model of Giftedness and Talent (DMGT)

https://www.researchgate.net/publication/287583969_Building_gifts_into_talents_Detailed_overview_of_the_DMGT_20

For a brief overview of the six profiles:

https://talentstimuleren.nl/?file=7484&m=1507559574&action=file.download

https://talentstimuleren.nl/?file=553&m=1370389145&action=file.download

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3. CURRICULUM PLANNING FOR GIFTED STUDENTS

Aims of the Learning Unit

Upon completion of this unit, the educator will be able to:

- Understand the different types of curriculum models for teaching gifted students.
- Understand the main strategies for educational intervention for gifted students, namely curriculum acceleration or flexibilization and curriculum enhancement.
- Develop tiered lesson plans, being able to adapt and complexify an already existing lesson plan, following tiered measurable learning outcomes.
- Adapt, modify, or replace the standard curriculum to meet the interests, strengths, and needs of gifted students.

Suggested contents

A curriculum is a set of objectives, basic competences, content, pedagogical methods, activities, teaching resources and evaluation criteria of each of the courses of an educational system.

Curriculum planning for gifted students aims to develop students' talent, enhance their learning, provide them with knowledge and skills to become independent and self-aware learners, and give them the tools to contribute to a better society.

Curriculum planning for gifted students is a complex process in which educators apply the theory and research-based curriculum and instruction models related to gifted students, and respond to their needs by planning, selecting, adapting and creating relevant content to ensure specific student outcomes. In this process, educators must emphasise advanced, conceptually challenging, in-depth, distinctive, and complex content within cognitive, affective, aesthetic, social, and leadership domains.

Educational interventions related to curriculum planning for gifted students

Children with unique educational assistance requirements as a result of their exceptional skills are often enrolled in conventional schools, based on the concepts of standardization, school and social inclusion, flexibility, education personalisation, and administrative coordination. These centres must ensure that they have the resources and instructional procedures necessary to satisfy their students' requirements.

To ensure that the educational needs they have are adequately addressed and met within the educational system, there are different kind of interventions to be implemented: 1) ordinary interventions (flexible grouping, adaptation of teaching resources, non-significant curriculum adaptation), 2) extraordinary interventions (significant curriculum enhancement), or 3) exceptional interventions (acceleration or flexibilization of learning stages).

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Grouping stands out among ordinary educational interventions. This is a collection of organizational strategies that enables the establishment of permanent or temporary groups based on the interests and talents of its gifted students through an enhanced, varied, and customized curriculum. It increases drive and performance but impairs social contact with other children.

Curriculum enhancement (with non-significant and significant curriculum adaptation or enhancement) entails modifying components of the standard curriculum in order to increase the level of complexity and so adapt it to the development of a student with exceptional intellectual ability. It is not only a matter of eliminating a portion of the fundamental curriculum (if required), but also of designing new components to replace those lost and to provide a greater challenge for the gifted student.

Curriculum acceleration or flexibilization entails working on the programme's content more rapidly, which allows the teaching of the content to be tailored to the students' precociousness. Acceleration enables students to access curricula that have been specifically designed for an older age group within the official programme.

Curriculum planning has to be adapted to the specific educational needs of gifted students (see Learning Unit 2), and in line with the instructional design (Learning Unit 6) and implementation (Learning Unit 7).

Curriculum models for gifted students

Models are patterns serving as guidelines to action, and can be found for almost every form of educational activity. Using a model to develop the curriculum can result in greater efficiency and productivity. By examining models or curriculum development, we can analyse the phases essential to the process.

Three fairly distinctive curriculum models that have been shown to be successful with gifted students at various developmental stages and in a variety of domain-specific topics are as follows: 1) the model of content mastery; 2) the model of process/product research; and 3) the model of epistemological concept. (VanTassel-Baska, 1986).

The content model places great value on mastering certain skills and concepts within a predefined subject of inquiry. Because gifted students are urged to move as quickly as possible through the content area, content acceleration in some form tends to dominate the practical implementation of this concept. The more prevalent method to content-based education is one that establishes the expected level of mastery for students, typically requiring pupils to master more advanced skills and ideas one year sooner. Because the content model is based on current school curricula and textbooks, implementation is not prohibitively expensive. Additionally, it aims to accommodate individual students' rate requirements, allowing the very gifted to proceed more swiftly through the regular curriculum.

The process/product model places a strong premium on students developing investigative abilities, both scientific and social, that enables them to create a high-quality product. It is a highly collaborative style in which the instructor, practitioner, and student work collaboratively to explore certain themes. The educational structure is dominated by consultation and individual study, ending in student comprehension of the scientific process.

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The epistemological concept model places a premium on gifted students' comprehension and appreciation of knowledge systems, rather than on the particular components of such systems. The teacher's function in this approach is that of a provocateur, posing interpretative issues for discussion and debate. Students' energy is directed to reading, reflecting, and writing. This approach views aesthetic enjoyment of powerful ideas in a variety of representational forms as a critical consequence.

Methodology

The following are methodological guidelines that help curriculum planning respond more effectively to gifted students:

Adapt instruction to the student's rate of learning: if they learn quicker, do not slow them down; do not bore them with repetitious learning; let them answer problems without working through their process; spend more time preparing than executing.

Avoid mechanical repetition and do not have them redo what they have previously mastered.

Allow for the use of advanced cognitive capacities such as abstract reasoning, symbolic reasoning, synthesis, creative thinking, and reflection on one's actions. Propose activities that entail the following: defining content or a scenario, recognizing any related content, explaining facts; comparing ideas, situations, and outcomes, establishing relationships; and analysing data, results, and facts, among others.

Encourage research and inquiry and give them the opportunity to dive further into the subject or topics of interest.

Encourage creative play as a strong tool for learning about the world and developing social and cognitive abilities, as well as a way to communicate anxieties, tensions, concerns, and pleasures.

Foster the growth of mathematical logical reasoning. Frequently, these students have mastered some of the skills necessary for the cycle or course to which they have been assigned. In this case, it is vital to enable them to develop a thorough understanding of the topic’s most abstract and complicated concepts, progressing to the application of operations in actual or imagined settings, and allowing them to work on multidisciplinary projects, among other things.

Encourage artistic practices on an individual and community level to help children develop their creativity, imagination, and emotional intelligence. Participating in musical arts initiatives fosters the ability to examine critically and to develop an awareness of one's own autonomy, action, and freedom of thought. Additionally, it fosters sentiments of belonging, to a group of friends and a classroom community, as well as the ability to apply fluency, inventiveness, and flexibility of thinking to issues with many solutions.

Encourage students' inquisitiveness. By and large, children with exceptional skills exhibit an insatiable thirst for information. To that end, the school should foster their natural curiosity, which includes accepting that there is no single correct answer to problems and questions, utilizing reflective questions and activities, and allowing the students to conduct as much research as necessary to gain a thorough understanding of the topics.

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Reiterate and convey your appreciation for originality and alternative thinking. Promote fluency, elaboration, uniqueness, and adaptability.

Utilise modern technology in the educational process, such as:

- Make use of the computer as a source of information, a means of communication, and a gateway to specialized areas of study.
- Develop familiarity with and proficiency with computer programs and resources used in digital support.
- Begin collaborating with social media platforms to exchange information, completed work, and so forth at their level.
- Work with programmes that enable the establishment of communication channels and the sharing of ideas between peers via blogs, wikis, etc.
- Instructing them in the practical, critical, and ethical usage of the web.
- Development of websites for the publication of any form of multimedia material.

Assessment

Curriculum assessment attempts to determine the influence of implemented curriculum on student (learning) accomplishment in order to change the official curriculum as appropriate and to conduct classroom observations of teaching and learning processes.

The assessment of the curriculum establishes the following: specific strengths and weaknesses of a curriculum and its execution; critical information for strategic adjustments and policy choices; necessary inputs for enhanced learning and teaching; monitoring indicators.

Evaluation methods may assess the efficacy of curriculum content, current pedagogies and instructional techniques, teacher training, and textbooks and instructional materials, among other things.

Curriculum evaluation's ultimate purpose is to guarantee that the curriculum is successful in encouraging higher-quality student learning. Thus, student assessment implies evaluation of gifted students' integral development in different areas: cognitive, creativity, socioemotional, motivation, etc.

Assessment of student learning may be summative or formative, and a variety of test types are available to meet a variety of objectives, including standardized exams, performance-based assessments, ability tests, aptitude tests, and IQ tests.

Tips for educators

- Adapt curriculum models and educational interventions to the specific needs of gifted students, and available resources.
- Promote the exercise of advanced cognitive capacities such as abstract reasoning, symbolic reasoning, synthesis, creative thinking, and reflection on one's actions.
- Encourage research and inquiry and give them the opportunity to dive further into the subject or topics of interest.

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- Utilise modern technology in the educational process, especially the use of ICT.
- Adjust your expectations for gifted students. Occasionally, children become confused or struggle with a task and exhibit age-appropriate emotions. They are not little adults, but youngsters or adolescents.
- Do not exaggerate your students' flaws. You'll simply serve to demotivate them. A pupil who reads quickly and has difficulty with penmanship needs more complex materials, not simply copies.
- Be adaptable when it comes to more mechanical or repetitive activities. Certain pupils with exceptional abilities require little training.
- Avoid overloading the class with repetitious activities. Allow everyone to do the tasks necessary to gain competency.
- Consider varied groupings: while youngsters with exceptional talents can effectively assist their peers, they occasionally require the company of others who have the same interests and ways of functioning.
- Avoid activities that foster competition and self-aggrandizement at the expense of the group. Avoid the systematic employment of high-ability pupils as "assistants". Remember that they attend school to learn.

References

Albes, C., Aretxaga, L., Etxebarria, I., Galende, I., Santamaría, A., Uriarte, B., Vigo, P. (2013). Orientaciones educativas. Alumnado con altas capacidades intelectuales.

López Garzón, J. C. (2012). Didáctica para alumnos con altas capacidades. Editorial Síntesis, S.A.

National Association for Gifted Children. (n.d.) Standard 3: Curriculum planning and instruction. Resources. https://www.nagc.org/resources-publications/resources/national-standards-gifted-and-talented-education/pre-k-grade-12-3

Sánchez Aneas, A. (2017). Atención integral al niño con altas capacidades intelectuales.

VanTassel-Baska, J. (1986). Effective curriculum and instructional models for talented students. Gifted Child Quarterly, 30(4), 164–169. © 1986 National Association for Gifted Children.

Van Tassel-Baska, J. (1989). Appropriate curriculum for gifted learners. http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_198903_tassel-baska.pdf

Practical Activities for Learning Unit 3

Activity 1

Name of the Activity
Creating a story!
Aims of the Activity

This activity aims to concentrate on two elements of literary creativity:

- Literary creativity
- Writing as a mode of expression

Description of the Activity

The gifted student will begin by developing two characters, sketching them and characterizing their appearance. They will define a space and a time period and then collaborate to construct their own tale.

It is critical to provide them complete creative freedom in order for them to write what they want and how they want. We do not intend to restrict creative expression in any of its forms or resources, while illustrating the steps necessary to create stories or stories. It is very important to let him/her to complete it alone.

Finally, the student is invited to read his/her narrative aloud at the conclusion of the session.

Resources

Paper and pencil for the student.

Optional: inspirational/relaxing/instrumental music in the classroom.

To find out more

References:

Garnica Betrán, M. (2014). Puedo 2. Programa de orientación educativa para alumnos de altas capacidades o superdotados.

Activity 2

Name of the Activity

Let's investigate!

Aims of the Activity

Gifted students place a premium on studying if it relates to their own interests. They are able to sustain a high level of performance in areas of interest, enhancing their drive for intellectual activity and so meeting their need to satisfy personal preferences. This activity's aims are as follows:

- To encourage and instruct students in the research process.
- To promote preference selection.

Description of the Activity

The student is asked to rate in order of preference the following topics: astrology, mathematics, physics, history, plants, animals, and literature.

The student is given a blank piece of paper with numbers ranging from 1 to 7; at the conclusion, a blank line is left for the student to pick a topic of particular interest to him/her, with the option of proposing anything:

1. _____
2. _____
3. _____
4. _____
5. _____

6. _____

7. _____

?. _____

The student must conduct research on all of the assigned subjects in the sequence specified.

For each topic, the student is questioned about why he or she selected it, how long they have liked it, and what he/she know about it. Due to the breadth of the themes, the student is then requested to choose a single component to explore.

Then the student is left to investigate by himself/herself.

Resources

Paper, pencil, colour pens

For research: encyclopaedia, access to internet

Optional: inspirational/relaxing/instrumental music in the classroom.

To find out more

References:

Garnica Betrán, M. (2014). Puedo 2. Programa de orientación educativa para alumnos de altas capacidades o superdotados.

4. LEARNING ENVIRONMENTS FOR GIFTED INSTRUCTION

Aims of the Learning Unit

The learning environment is one of the key concepts in delivering quality education. An effective learning environment can provide teachers and learners with an appropriate setting to improve not only their academic success and enjoyment during teaching/learning activities but also their social, emotional, and behavioural well-being.

Upon completion of this unit, the educator will be able to:

- Describe a conceptual framework of the learning environment for gifted instruction.
- Describe a STEAM learning environment for gifted instruction.
- Describe the process of development from theory to practical implementation in the learning environment for STEAM education.

Description

Conceptual framework of learning environment for gifted instruction

Learning environments promote personal and social responsibility, multicultural competence, and interpersonal and technical communication skills for 21st century leadership to ensure student-specific results (NAGC, 2019). Learning environments are like aquariums. Just as the temperature, cleaning and feeding of the living creatures within is important for an aquarium, so the physical and psychological arrangement of learning environments for students is just as important (Akdeniz, 2020).

It is very important to be aware of the functions of the learning environment and their possible impact on gifted and talented pupils; a learning environment is a place for children to realize their personal characters and development. The following are suggested topics:

- Describing the conceptual framework of learning environments for gifted instruction
- Describing formal learning environments for gifted instruction
- Describing informal learning environments for gifted instruction
- Describing the physical learning environment for STEAM education
- Describing the student learning environment for STEAM education
- Describing the teacher learning environment for STEAM education
- Defining STEAM training as 21st century skills
- Defining STEAM education in a learning environment as a future laboratory
- Defining workshops as STEAM education learning environments.

STEAM Learning Environment for Gifted Instruction

The STEAM education environment should be developed with consideration for the physical environment, student environment, and teacher environment. These are interrelated areas, so they could be examined together. When we think about the physical environment, we also

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consider the student and teacher environments. For example, when we mention that a learning environment is designed with a multidisciplinary approach, we also reflect on whether the teacher has the competence to use that approach. As a result, it is better if the physical, student and teacher environments are considered at the same time.

From Theory to Practical Implementation in the Learning Environment for STEAM Education

This course provides an overview of the process from theory to practical implementation of learning environments in STEAM education.

Firstly, STEAM training will be discussed as a 21st century skill: the characteristics of collaboration, communication, creativity, problem solving, and critical thinking are all linked with STEAM education.

Secondly, the learning environment of STEAM education as the classroom laboratory of the future will be mentioned. An example of a learning environment in the STEAM classroom laboratories of the future will be presented.

Thirdly, workshops will be discussed as a learning environment for STEAM education. In this part, information will be presented about workshops for gifted students in science and art centres, which are official institutions for gifted students in Turkey.

The Physical Learning Environment of STEAM Education

Gifted education provides access to advanced communication tools, including assistive technologies, and the use of these tools to express higher-level thinking and creative productivity (NAGC, 2019). Quality of learning is determined by learning environments, including experiences, rather than by subject areas. For example, with the help of observations and discoveries made in natural environments, students can better perceive nature, increase their knowledge of ecological concepts and processes, become more aware of the environment, and act more responsibly (Nuhoğlu, İmamoğlu, 2018).

Methodology

The methodology of the learning environment could be linked with knowledge, skills and competences.

When we mention knowledge, we can take into account:

- functions of the learning environment and their possible impact on gifted and talented pupils
- different and unique needs of gifted and talented pupils, and design the appropriate learning environment to support them
- the rationale behind setting appropriate expectations for gifted and talented pupils.

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When we mention skills, we can take into account:

- the effective learning environment for gifted and talented pupils
- awareness of the different and unique needs of gifted and talented pupils and design an appropriate learning environment considering their needs
- set advanced expectations based on gifted and talented pupils' traits and potential gifts, for instance creativity.

When we mention competencies, we can take into account:

- describing an effective learning environment for gifted and talented pupils
- being aware of the importance of creating an appropriate learning environment
- understanding their needs
- setting advanced expectations that support students' skills and well-being.

Assessment

Teachers could be evaluated on the basis of these learning outcomes:

- Realizing that the output objectives correctly address the identified problems and needs of the gifted students
- Arranging the learning environment by taking into consideration its effectiveness on gifted students' development
- Asking: Are the outputs, resources, contents, tools etc. used efficiently by gifted students?
- Asking: What is the impact of the arrangement of the learning environment on gifted students?
- Asking: Does the learning environment affect the development of gifted students in a sustainable way or not?

Tips for educators

Some practice principles that teachers should take into account are:

1. Careful and well-organized learning experiences are a prerequisite for effective teaching.
2. Teachers can prepare students for learning by determining what they will gain in advance and creating the necessary clues for learning strategies.
3. Content should be presented to students in a clear and meaningful way in order to increase permanence in meaningful learning. It is also necessary to pay special attention to the establishment of links between the structure of the content and the sub-topics.
4. Students want feedback as they reinforce and apply what they have learned. For this reason, feedback should be provided to the students while doing exercises and practice studies.

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References

Akdeniz, H. (2020). Özel yetenekliler için sınıf içi eğitsel düzenlemeler [Instructional interventions for gifted students in classroom]. A. Ataman & R. Özmen (Eds.), In öğrenme güçlüğü ve özel yetenek [Learning disability and gifted]. Vize.

Gagné, F. (2013). The DMGT: Changes Within, Beneath, and Beyond. Brossard

Heller, K,A., Perleth, C. (2008). The Munich High Ability Test Battery (MHBT): A multidimensional, multimethod approach. *Psychology Science Quarterly. 2* (50). 173-188.

Hong, O. (2017). Korea Foundation for the Advancement of Science & Creativity. Seolleungno.

Kim, M. (2016) A meta-analysis of the effects of enrichment programmes on gifted students. *Gifted Child Quarterly,* 60: 102–116.

National Association for Gifted Children (2019). Pre-K to Grade 12 Gifted Programming Standards. Retrieved from https://www.nagc.org/resources-publications/resources/national-standards-gifted-and-talented-education/pre-k-grade-12

Nuhoğlu, H., & İmamoğlu, Y. (2018). An Interdisciplinary Nature Education Program for Gifted Primary School Students and its Effect on their Environmental Literacy. Elementary Education Online. 17. (4). 1928-1943.

Rayneri, L. J., Gerber, B. L., & Wiley, L. P. (2006). The relationship between classroom environment and the learning style preferences of gifted middle school students and the impact on levels of performance. *Gifted child quarterly*, *50*(2), 104-118.

Reis, S. M., & Renzulli, J. S. (2011). Challenging Gifted and Talented Learners with Interventions Strategies. 456-482; in Bray, M. & Kehle, T., *The Oxford handbook of school psychology*. Oxford: Oxford University Press.

Ruokonen, I. (2005). Estonian and Finnish gifted children in their learning environment. Helsinki.

Van Tassel-Baska J and Hubbard G (2016). Classroom-based strategies for advanced learners in rural settings. Journal of Advanced Academics. 27: 285–310.

WEB 1, quoted on 15 November, https://www.exquisite-minds.com/idea-of-the-week/identifying-the-creative-child/

WEB 2, quoted on 15 November, https://www.brevardschools.org/domain/7540

WEB 3, quoted on 15 November, https://steamedu.com/wp-content/uploads/2014/09/STEAMprogramDescription2013.pdf

WEB 4, quoted on 15 November, https://tinker.ly/the-difference-between-stem-steam-and-stream/

Practical Activities

Activity 1

Name of the Activity
Narrow street (9-13 age)
Aims of the Activity
What does the concept of boundaries mean (physical and personal boundaries)?
Description of the Activity
1. Chairs facing each other 2. Let's line up closely, with only a little distance in between. (After chairs are lined up) This is a street now and we are speaking to each other. 3. We will try to cross from one end of this street to the other without touching it. 4. Now with long lines to you, I will give you balloons. 5. We will tie these balloons to our arms or foot. 6. And again from the narrow street without touching each other, we will try to pass. Possible discussion questions: • What did you do while trying to pass through the narrow street without touching each together? • What would happen if you weren't paying attention? • How to cross the narrow street I did not tell you, so I did not set a rule, just to each other I said do not touch each together. • You set the rules by considering not to touch each other. You pulled to the right or left, you stooped, you stopped. • Did setting rules make it easier for you to walk? You were careful not to bump into each other while crossing the narrow street because if you crashed, maybe you would get hurt, you would get angry.
Resources
• Time: 20 min • Balloon, rope, chair
To find out more
Psychosocial Support Practice Guide, Activities for 9-13 Ages

Activity 2

Name of the Activity
Differences Are Here!
Aims of the Activity
Developing awareness of living together with individuals with different cultural characteristics.
Description of the Activity
Before the activity starts, the STEAM educator prints out the images in Annex-1 and cuts them out and sticks them on the cardboard. S/he hides the pictures s/he pasted on the straws out of sight. This creates the 1st pool. The STEAM educator prints out the images in Annex-2 and cuts them out and sticks them on the cardboard. S/he sticks pictures on the straws and hides them out of sight. This creates the 2nd pool.

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The STEAM educator brings the two pools to the classroom and explains the activities to the children: “Dear children, today we are going to look for pictures hidden in pools with you, and I will read you some stories about the pictures we found. We will learn about the lives of the people in the pictures we found.”

The STEAM educator allows a student to find a picture from the 1st pool (each picture is found by a different student). After each picture is found, the STEAM educator reads the story of the picture found by the student to the class (the stories are found in Annex-3). After reading the story, s/he asks the class some questions and gets answers. The STEAM educator gives guidance with questions such as “What features of [the name of the character in the story] are different from us?”; “How does [the character] look different from us?” S/he asks the class “What does [the name of the character] need to be happier?”

The STEAM educator allows the student to find the related image in Annex-2 from the 2nd pool and match it with the character found in the 1st pool. If the student finds a different image, they continue searching until they find the associated image. Other images are placed back into the 2nd pool again.

The educator asks, “How can we help [name of character in the story]?” The game continues until all the pictures are found.

Then to the whole class, “Now imagine that all the children in our stories are your classmates, what games would you like to play together?”

Finally, the STEAM educator says, “Dear children, we made an activity together today. We have seen that people with differences can live together. We talked about how we can support each other with our friends who have differences in our environment. Although we have differences we can live together.” This ends the activity.

Annex-1

Annex-2

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Annex-3

Images	Stories	Related Images
1st Image: Muhammed 	Muhammed was born in Syria. There was war in his country. Her family is afraid that something would happen and migrated to another country because their place of residence was not safe. They had to migrate. Muhammed who faced many difficulties while emigrating had not yet started school in new place.	
2nd Image: Berfin 	There had been a great earthquake when Berfin was 6 years old. Because of her father's grocery store and their houses are destroyed they moved to their uncles' house. Because of their living environment is so crowded, Berfin had difficulty doing homework and playing game.	

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3rd Image: Ahmet 	Ahmet lived with his family in Trabzon. Ahmet's father could no longer earn money by farming alone. Ahmet's fathers needed a new job to meet the school expenses of Ahmet and his three siblings. Ahmet's father was also a car mechanic, but he could not find a job anywhere. That's why Ahmet and his family moved to a big city.	
4th Image: Aylin 	Aylin had an accident when she was 8 years old and because of accident she could not walk anymore. Aylin needed treatment in a larger hospital to be able to walk. That's why Aylin and her family left the village where they lived and moved to the city where the hospital is located.	
5th Image: Rıza 	Rıza and her family living in France decided to return to their country. They return to Turkey and begin to live with her grandmother. However, Rıza couldn't understand what was being said in Turkish because of the fact that Rıza was born in France. Rıza missed the playing with his friends in France.	

Resources

Running Time: 60 min.

Preparation:

2 Boxes/Containers (For storing pictures)

The material we can store pictures like Fibre/Cotton/Rice

Images

Stories and associated pictures

To find out more

Psychosocial Empowering Support Program-Migration Trauma, 2019.

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5. TEACHING BASIC SKILLS TO GIFTED STUDENTS THROUGH STEAM EDUCATION

Aims of the Learning Unit

The aim of Learning Unit 5 is to help learners acquire a basic overview of what STEM is and the type of mindset it cultivates, and why. It will examine why STEM became STEAM and what additional benefits were offered by including Arts. Studying Unit 5 will also provide a review of Digital Literacy practices and Soft Skills, which can be applied through STEAM, to expand learners' awareness of a new range of enrichment opportunities for gifted children in mixed ability STEAM classes.

Description

What is STEM?

The acronym STEM stands for Science, Technology, Engineering and Mathematics. A STEM lesson combines ideas and concepts from each field into a single, cross-disciplinary lesson and highlights that connection to students. STEM lessons are usually highly applicable to real-world situations and show students that most solutions require multidisciplinary input.

STEM lessons focus on encouraging students to collaborate, be adaptable and think in ways that will meet the innovation and economic requirements of the ever increasingly technological world of the future.

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What is a STEM mindset?

The overarching objective of STEM is to create in students a STEM mindset. A STEM mindset is a growth mindset, which means that it is not fixed and focused on a goal, but engaged in continuous inquiry. In STEM lessons, students are constantly problem-solving, questioning, evaluating, designing and revaluating. STEM style thinking represents a valuable asset to students on their future career paths because its application has a broad scope. The STEM growth mindset shows students that there is no progress without effort and that acquiring knowledge is a journey.

Why did STEM become STEAM?

STEM educators recognised that Science, Technology, Engineering and Mathematics share a common focus and approach with another discipline, the Arts. All five fields promote active enquiry through process, which is key to the inclusion of the Arts. The Arts and, in particular, Art trains students to be non-linear thinkers, which is crucial in STEAM education.

What is Non-Linear Thinking?

Non-Linear Thinking is the capacity to connect and consider thoughts and facts together around a loose central theme or train of inquiry. This is as opposed to Linear Thinking which observes, models the observations based on relevant domain theory, applies principles or mathematics and arrives at some form of deduction. The endorsement of Non-Linear Thinking by STEAM is an endorsement of the fact that our most complex and challenging real-world problems will remain unaddressed and unsolved without a fluid, Non-Linear, unconstrained, and cross-disciplinary approach.

What does this Non-Linear Thinking look like in practice?

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Non-Linear Thinking asks open-ended questions and is a thinking style where there is an openness and freedom to bounce off other people's creative thoughts. Artists, in particular, are trained to be curious, self-directed, openly communicative, observant, and are encouraged to be obsessive in pursuit of a line of inquiry. That is why artists are "multidisciplinarians", meaning they are familiar with an extensive range of topics and not afraid to explore disciplines outside their skillset to pursue a particular course of interest.

It is worthy of note that people with Attention-Deficit / Hyperactivity Disorder (ADHD) often think associatively rather than linearly and as such are naturally predisposed to Non-Linear Thinking.

What are soft skills?

Soft skills are skills that are essential to the success of STEAM projects both in the classroom and in the workplace. They are skills such as being able to take on a leadership role effectively, and understanding how to engage in teamwork, what it means to hold empathy for others through perspective-taking, the capacity to recognise and respond to emotion in others in a non-judgemental fashion, and how to communicate the recognition of said emotion.

The capacity to be creative is also a soft skill. Creativity is about making connections, observations, experiments, networks, envisioning and engaging with topics by applying inquiry-based learning. Critical thinking and problem-solving are also examples of soft skills.

What soft skills can teachers of gifted children cultivate with STEAM education?

Teachers can cultivate soft skills through STEAM education, but they first need to be aware and conscious of what soft skills are and how to incorporate them into lesson planning. Teachers need to consciously practise soft skills in their STEAM lesson plans or projects and keep records of students' progress with this in mind.

Gifted students in particular often suffer skill-set deficits in soft skills. This deficit is a barrier to them achieving their full potential, and to human innovation and progress. By addressing soft skills through STEAM with gifted students, teachers are availing of a two-fold opportunity. The first opportunity for teachers is to become aware of their capacity to assist gifted students in developing soft skills consciously through their STEAM projects and lesson plans. And the second opportunity is to consider how gifted students test their teacher's soft skills and where there is room for upskilling, improvement and increased levels of compassion towards twice-exceptional students.

What is digital literacy?

Digital literacy refers to the particular set of competencies needed for an individual to participate in a meaningful way with the digital world. Today's students are considered to be 'digital natives'. The term digital native describes a young person who has grown up in the digital age, in close contact with computers, the Internet, and video game consoles, and later mobile phones, social media, and tablets.

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Being digitally literate is an essential skill required to engage in school, work and lifelong learning. Digitally literate students should be able to:

- Identify a range of different types of media and formats
- Search the internet effectively
- Seek and find information relevant to their line of enquiry
- Exercise critical thinking in the selection of information they find
- Use digital information in an ethical manner
- Communicate to others about the digital tools they apply
- Be able to create information with digital tools
- Share information with digital tools.

What digital literacy practices are complementary to a STEAM education programme for gifted students?

Ideally, teachers should incorporate as many relevant digital literacy practices as possible into their STEAM projects and lesson plans without drawing the student away from the core aim. As today's students are digital natives, it is worthwhile asking them how they would use the digital realm to achieve the target learning aim. The use of the digital realm offers the students the opportunity to also employ soft skills in tandem.

What digital literacy practices are complementary to a STEAM education programme for gifted students?

The type of digital literacy practices which are complementary to STEAM education programmes for gifted students depends on the content of the STEAM project or lesson you

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are creating and the competence you are working on. The digital realm is fast-paced, and what was a cutting-edge tool six months ago may not be considered so today, so it is recommended that teachers frequently review the digital tools they are employing.

Methodology

Learning Unit 5 teaches key competences for success in STEAM education for gifted students by establishing why STEM became STEAM, and by examining an integral component of an artistic mindset: Non-Linear Thinking. It also draws teachers' awareness to twice-exceptional students – gifted students whose learner profiles may already be naturally predisposed to associated thinking. The unit's training in Non-Linear Thinking is expanded upon in the practical activities.

Learning Unit 5 also draws teachers' attention to what soft skills are and highlights to teachers the necessity to create STEAM projects and lesson plans with their cultivation in mind. It highlights to teachers how being gifted and having a deficit in soft skills often go hand in hand. The selection of soft skills to be worked on is entirely student-specific and as such will require individual monitoring and flexible classroom practices, in order to maximise the educational opportunities to achieve this aim.

Finally, this unit addresses the inclusion of digital literacy in STEAM lessons by encouraging the teacher to take on the role of curator and to review relevant digital tools within their STEAM projects and lesson plans a minimum of every 6 months. It promotes the teacher working with the student to establish what digital access the student has and to foster the student's own curation of digital tools and research.

Assessment

To assess whether a teacher is successfully managing to teach the key competencies for success in STEAM for gifted children one must do the following:

1. Establish if the teacher can differentiate between STEM and STEAM
2. Establish if the teacher can explain, recognise and practice Non-Linear Thinking
3. Establish if the teacher can define what a soft skill is
4. Establish if the teacher can recognise soft skill deficiency in students
5. Establish if the teacher can incorporate supportive digital tools and digital research practices into their STEAM projects and lessons
6. Establish if the teacher can reasonably assess the associated risks to students as a result of the use of digital tools and resources.

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Tips for educators

- Make space for the cultivation of Non-Linear Thinking in your STEAM lessons and projects. This might mean setting lessons without a rigid outcome or allowing students to self-direct their STEAM lessons or projects.
- Try to consider what disciplines your particular STEAM lesson or project's objective might incorporate in advance.
- Compile and continuously add to a bank of resources to facilitate explorative thinking in key topics.
- Students who are gifted, in particular twice-exceptional students, often struggle with soft skills.
- Make a regular habit of incorporating the working of soft skills into lessons.
- When assessing students, and particularly gifted students, try to make a habit of assessing their strengths and weaknesses in terms of soft skills; this will positively inform your engagement with each individual student during lesson time.
- Make sure you consider the use of digital tools and the digital realm in your STEAM lesson or projects.
- Consider any use of digital tools and the digital realm in terms of risk to the students.
- Always ascertain from students in advance the level of access they have to digital tools in advance of setting digital-based homework.

References

What is STEM education?
https://www.liysf.org.uk/blog/what-is-stem-education

Understanding STEAM and how children use it
http://msafterschool.org/wp-content/uploads/2020/05/steam-ipdf.pdf

Interpersonal Skills of Gifted Students: Risk versus Resilience by Holly Joy Perham, Arizona State University
https://core.ac.uk/download/pdf/79563931.pdf

Non-cognitive Characteristics of Gifted Students With Learning Disabilities: An In-depth Systematic Review by Else Beckmann and Alexander Minnaert
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5919977/

Social and Emotional Learning Needs of Gifted Students by Derek Phelan and Allen Phelan Walden University
https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=6092&context=dissertations&fbclid=IwAR0JNQ-TZkUMpa8e-WUKio4QREu4-kBG0SfcD3vQ-7JLzpD0B41QuKXTpLQ

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Practical Activities

Activity 1

Name of the Activity
"Yes, and...": Non-Linear Thinking for STEAM projects and lessons
Aims of the Activity
The aim of this activity is to provide the learner with a practical activity to foster Non-Linear Thinking for improved student success in STEAM projects and lessons. The activity takes the form of a game where learners explore a topic without a defined objective.
Description of the Activity
Step 1: Write the following on the whiteboard - Linear Thinking = Linear Thinking is a form of thinking where thinking progresses straight along a single line from one stage to another and has a starting point and an ending point. Non-Linear Thinking = Non-Linear Thinking is multidirectional thinking centralised around loose lines of interest and enquiry. Step 2: Divide the learners into groups of four. Step 3: Ask the learners to discuss the difference between Linear and Non-Linear Thinking. Step 4: Ask the learners to assign the role of scribe for the group to one member. Step 5: Now ask the learners to discuss some examples of Linear and Non-Linear Thinking and take notes. Step 6: Ask each group to share their examples and write their answers into Linear Thinking and Non-Linear Thinking categories on the whiteboard. Step 7: Now reorganise the learners into groups of three. Tell them they are going to play Non-Linear Thinking games around a topic. Step 8: Place the topics in a hat and distribute one topic at random to each group. Step 9: Ask each group to assign the role of scribe for the group to one member. That member is to take notes on a game that the other two members will play. Step 10: Instruct the other two members to play a game called "Yes, and…" and write the following rules on the whiteboard. The Rules for "Yes, and…": 1) Player 1 - Takes notes by writing a statement given by the teacher at the centre of a brain map. Player 2 & 3 - Select a statement from the hat. 2) Player 2 & 3 set a timer for 5 minutes. 3) Player 2 begins by starting the timer and reading the statement from the hat. 4) Player 3 responds by saying "Yes, and…" adding an associated statement of their own creation. 5) Player 2 continues by saying "Yes, and…" and vice versa until the 5 minutes are complete. 6) If either Player 2 or 3 takes longer than 30 seconds to say their "Yes, and…" sentence they forfeit their turn, and it passes to whoever is next. Step 9: Once the game is complete ask the note taker to share their brain map with their group and ask the group to reflect for 10 mins about their "Yes, and…" game. Step 10: Invite each group to share their reflection and highlights from their brain maps with the class group.

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Step 11: Ask learners to reflect on anything they found surprising about where their Non-Linear Thinking "Yes, and…" game took them. Step 12: Collect all of the learner's brain maps and store them for the follow-on class safely and accessibly.
Resources
Mind Map templates https://templatelab.com/mind-map/ Sample statement examples for "Yes, and…" game: 1) Governments must legislate and hold industry accountable for environmentally hazardous materials they use. 2) Everyone in the world should have the same access to medical care. 3) ½ of air travel emissions are caused by private planes. 4) We all need to improve our day-to-day recycling.
To find out more
The power of Non-Linear Thinking https://www.americanexpress.com/en-us/business/trends-and-insights/articles/power-non-linear-thinking/ "Yes and…" (adapted from https://www.dramanotebook.com/drama-games/yes-and/) Improvisational Warm Ups : Playing the "Yes, And" Improv Game Digital Literacy: A Demand for Nonlinear Thinking Styles Mark Osterman, Thomas G.Reio, Jr., and M. O. Thirunarayanan Florida International https://www.semanticscholar.org/paper/Digital-Literacy%3A-A-Demand-for-Nonlinear-Thinking-Osterman-Reio/0b2303d2cc9e75df4327104644d8def3a4967585

Activity 2

Name of the Activity
Using Non-Linear Thinking brain maps to foster the use of soft skills and digital literacy in STEAM projects and lessons.
Aims of the Activity
This activity is designed to be used as a follow on to "Yes, and...: Non-Linear Thinking for STEAM projects and lessons". In this activity, the learners use the brain maps they developed in the previous activity to work in a group to discuss and design opportunities for fostering and cultivating soft skills and digital literacy in STEAM projects and lessons.
Description of the Activity
Step 1: Write the words "Soft Skills" on the whiteboard. Step 2: Ask the learners to call out examples of "Soft Skills" and write them up. Step 3: Ask the learners to justify what they call out and add any soft skills they have omitted from Soft Skills - Definitions and examples in the resource section. Step 4: Instruct the learners to return to their group of three from the "Yes, and...": Non-Linear Thinking for STEAM projects and lessons" class. Step 5: Redistribute their brain maps. Step 6: Ask each group to select and write down three Soft Skills they can work into a lesson plan based on their brain maps from the previous activity. And ask them to justify their use of their choices.

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Step 7: Invite each group to discuss their chosen Soft Skills with the class and give feedback to each other.

Step 8: Now write the following on the whiteboard.

Digital Literacy means being able to understand and use technology. Digital literacy skills allow you to find, use & create info online in a productive & useful way. Having an understanding of digital literacy means you're able to use technology safely and it helps you avoid its dangers.

Step 9: Assign one member of each group to take notes and invite each group to discuss their brain map in terms of the following.

1) What Digital tools and resources might support it?

2) What are the risks associated with the use of these digital tools and resources for primary school students?

Step 10: Invite each group to discuss their chosen digital tools and resources with the class and give feedback to each other.

Step 11: Invite each group to share the risks they deem to be associated with the use of their chosen digital tools and resources by primary school students.

Step 12: Ask each group to reflect on the class and discuss how they might improve their STEAM projects and lessons from what they have learned.

Resources

Soft Skills - Definitions and examples https://www.indeed.com/career-advice/resumes-cover-letters/soft-skills

Digital Literacy Skills: Online Safety

https://www.webwise.ie/teachers/online-safety-skills/

To find out more

A model for digital literacy

http://www.mathiaspoulsen.com/a-model-for-digital-literacy/

Digital literacy for children: exploring definitions and frameworks

https://www.unicef.org/globalinsight/media/1271/file/%20UNICEF-Global-Insight-digital-literacy-scoping-paper-2020.pdf

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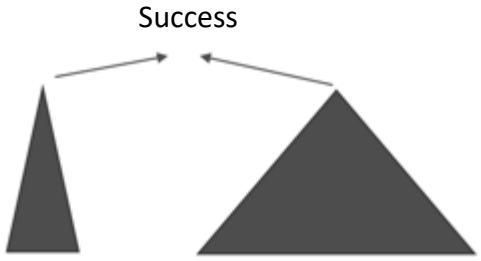
6. INSTRUCTIONAL DESIGN OF STEAM FOR GIFTED STUDENTS

Aims of the Learning Unit

The aim of this learning unit is to explain the importance of interdisciplinary teaching in the education of the gifted, to examine the types of interdisciplinary integration and to discuss the approaches to these integrations, and to present ideas for using STEAM in an instructional design.

Description

Gifted individuals are generally defined by their broad interests and desire for in-depth learning. Because of these characteristics, it is very important that they receive an education based on interdisciplinary interaction from an early age.



The Interdisciplinary Interaction-Specific Skill-Achievement model (IISSA)

The Interdisciplinary Interaction-Specific Skill-Achievement (IISSA) model above was developed to visualize the relationship between success and interdisciplinary interaction and skill development. The heights of the two triangles are taken as equal and the vertices are assumed to be success. The base of the triangle was chosen to represent interdisciplinary interaction and unique skill development. While the expansion at the base represents increased interdisciplinary interaction, the path to success is taken as the other sides of the triangles. It is seen that the slope leading to success in the left triangle is quite challenging and steep, but in the right triangle, although the road is longer, it has a relatively easy slope. In this sense, in order to achieve success, receiving and associating interdisciplinary education has an important place in terms of intelligence and skill development of the individual, but also provides an important advantage on the road to success. When the biographies of historically successful scientists or artists are examined, we can say that many individuals we call "gifted" or "genius" follow the path in the second triangle.

It is important that, from an early age, gifted individuals' potential in detailed observation, questioning and questioning skills, and their superior curiosity can be developed into scientific curiosity. This can ensure that gifted individuals with broad interests can be guided more

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accurately and exhibit superior performance individually, with an interdisciplinary education, and on the basis of lifelong learning.

In their reports, The National Academies (2005) and National Research Council-NRC (2009, 2012) emphasized the importance of the integration of different disciplines in order to understand the complex structures underlying the local and global problems encountered today and to solve these problems. These studies led to the emergence of new models in the field of education, and emphasized that it is necessary and beneficial to integrate different disciplines at the focal point of many of these models (Honey, Pearson, & Schweingruber, 2014; Moore et al., 2014).

One of these models is the STEM Education model, which is widely adopted and used in developed and developing countries, and which aims to integrate the basic disciplines of Science, Technology, Engineering and Mathematics. The main purpose of STEM education is to integrate broad disciplines such as natural sciences (basic sciences such as physics, chemistry, biology, agriculture), technology (computing/computer sciences), engineering (engineering technologies and sub-branches of engineering), and mathematics and its sub-disciplines (Chen, 2009).

Recently, research has emphasized the importance of art and aesthetics in finding innovative approaches for solving real-life problems. With this emphasis, a science, technology, engineering, arts, and mathematics (STEAM) education model was developed by adding the arts to STEM education (Baker, 2014). The existing studies argue that the arts are crucially important for developing skills such as creativity, observation, visualization and manual skills, which constitute the base of the scientific thought process (Cantrell, 2015). The arts also support understanding the engineering design process, conducting this process, and improving spatial thinking, which are important in learning mathematics (Yokana, 2014). In this sense, it is thought that activities or projects created with a holistic approach to disciplines such as STEAM education will play a critical role in the education of gifted individuals.

Methodology

In the field of education, different methods are followed in the integration of different disciplines into the instructional design of activities in models, such as STEAM education models. While Vasquez, Sneider and Corner (2013) mentioned that interdisciplinary integration will be done in different ways and levels, English (2016) emphasized that integration includes different forms, different levels *and* mutual connections. In Table 1, the concepts of multidisciplinary, interdisciplinary and transdisciplinary, introduced at the disciplinary and hierarchical level, include the level of integration and the characteristics and definitions of the level (from Vasquez et al., 2013). As can be understood from the definitions made in the context of integration levels, integration occurs by combining at least two or more disciplines for a certain purpose. The most important feature that distinguishes the levels of integration from each other is the purpose.

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Table 1

Integration Level	Properties of Integration Level
Disciplinary	Concepts and skills are learned separately in each discipline.
Multidisciplinary	Concepts and skills are learned in each discipline separately but within a common theme.
Interdisciplinary	Closely related concepts and skills are learned by combining two or more disciplines to deepen knowledge and skills.
Transdisciplinary	Knowledge and skills learned from two or more disciplines are applied to real-life problems and projects to help shape the learning experience.

Assessment

Designing STEAM activities requires a process. During this process, different criteria can be developed to evaluate the event as a STEAM event for gifted students. While these criteria vary according to the group studied, they can also be evaluated in terms of interdisciplinary interaction. In this sense, it is possible for the activities to be inquiry-based, to be evaluated in terms of interdisciplinarity and cross-cutting concepts.

Tips for educators

- Identify the concept or phenomenon.
- Do research on the concept or phenomenon in different disciplines or contact relevant field experts.
- Identify common sub-concepts and differences related to the concept or phenomenon on a disciplinary basis.
- Examine how you can interact on common concepts, and which approach you will take (multidisciplinary, interdisciplinary or transdisciplinary) within the framework of STEAM.

References

Karabey, B., Koyunkaya, M. Y., Enginoglu, T., & Yurumezoglu, K. (2018). Discovering complementary colors from the perspective of steam education. Physics Education, 53(3), 03500.

Yurumezoglu, K. (2009). An entertaining method of teaching concepts of linear light propagation, reflection and refraction using a simple optical mechanism. Physics Education, 44(2), 129.

Yurumezoglu, K., Karabey, B., & Koyunkaya, M. Y. (2017). Shadows constructing a relationship between light and color pigments by physical and mathematical perspectives. Physics Education, 52(2), 025008.

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Yurumezoglu, K., Karabey, B., Koyunkaya, M. Y., Enginoglu, T (2019). Okul Duvarlarının Ötesine Öğrenme Yolculuğu, Nobel Kitap, p. 311-331.

National Research Council (U.S.)., Donovan, S., Bransford, J., & National Research Council (U.S.). (2005). *How students learn*. Washington, D.C: National Academies Press.

National Research Council. (1996). *National science education standards*. Washington, DC: National Academies Press.

National Research Council. (2009). *Learning science in informal environments: People, places, and pursuits*. Washington, DC: National Academies Press.

National Research Council. (2012). A framework for K-12 science education: Practices, crosscutting concepts, and core ideas. Washington, DC: National Academies Press.

Honey, M., Pearson, G., & Schweingruber, H. A. (Eds.). (2014). *STEM integration in K-12 education: Status, prospects, and an agenda for research* (p. 180). Washington, DC: National Academies Press.

Moore, T. J., Stohlmann, M. S., Wang, H.-H., Tank, K. M., & Roehrig, G. H. (2014). Implementation and integration of engineering in K-12 STEM education. In J. Strobel, S¸. Purzer, & M. Cardella (Eds.), *Engineering in precollege settings: Research into practice*. West Lafayette, IN: Purdue Press.

Chen, X. (2009). *Students who study Science, Technology, Engineering, and Mathematics (STEM) in postsecondary education*. U.S. Department of Education, NCES 2009-161: National Center for Education Statistics.

Practical Activities

Activity 1

Name of the Activity
COLOURFUL SHADOW
Aims of the Activity
Learners often generalize as a result of the repetition of similar observation results. However, as the famous philosopher Gaston Bachelard stated, "Every generalization, including this sentence, is wrong." Generalizations are one of the mistakes people often make. In this activity, a multidisciplinary activity was be designed from a mathematical point of view by questioning the concept of shadow.
Description of the Activity
Light follows a linear path in vacuum but can change direction when it encounters matter. Materials that do not transmit light are called opaque. In this activity, we will examine the formation of shadows, penumbras and multiple shadows based on the phenomenon of linear propagation of light. What do we need? Three lamps (preferably LED lamps) in red, blue and green

12-volt DC adapter (required depending on lamp specification)

An opaque barrier (opaque white balloon was used for this experiment)

A white colour screen/surface.

Let's place the red, blue and green LED lamps in a triangle and plug the 12-volt adapter into the socket. Placing the lamps in a triangle will make it easier to understand how the rays of different colours emitted from the light sources are mixed.

Then, in a completely dark environment, let's turn on the red, blue and green lamps one by one and observe what happens on the screen by placing the balloon, which is an opaque obstacle, in front of them. Here, we observe that the area behind the obstacle where the light cannot reach is black/dark, and the other areas where the light reaches are the same as the colour of the source light. It is seen that the same situation is repeated for each colour in the experiment [2]. (YouTube video 00:00 – 01:20).

> Please note to access this video with subtitles switch on the cc at the bottom right of the screen and then go to settings > subtitles > auto-translate and select your language of choice

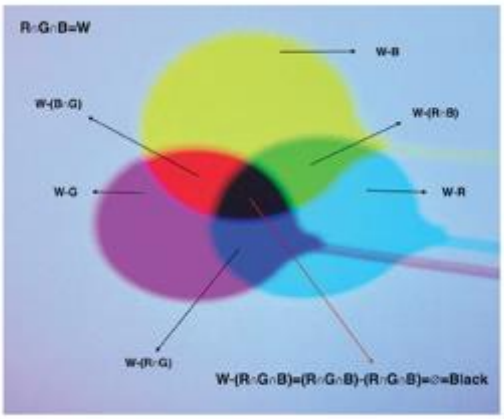
Let's repeat the experiment with the lamps, this time turning on two light sources at the same time. Let's turn on the blue - red, blue - green and red - green lamps, respectively, and observe the shadow formations by placing an opaque white balloon as an obstacle in front of them [2]. (YouTube video 01:20 – 02:20).

> Please note to access this video with subtitles switch on the cc at the bottom right of the screen and then go to settings > subtitles > auto-translate and select your language of choice

Finally, let's turn on all three of the lamps (red, blue and green) and observe the shadow formation by placing an obstacle in front of it. In the common region of all intersections we observe full shadow (in black) and otherwise coloured shadows consisting of primary colours and secondary colours [2]. (YouTube video 02:20 – 02:40).

> Please note to access this video with subtitles switch on the cc at the bottom right of the screen and then go to settings > subtitles > auto-translate and select your language of choice

It is possible to associate the last image of the experiment with the subject of sets in mathematics. In this way, the mathematical construction of the relationship between paint and light colours, which the student can only obtain experientially, can be provided as follows [1]:



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Expressing shadows in terms of sets. [1]

Now let us find a mathematical model in the language of sets to express the black area/shadow formed with three light sources and the opaque object. We can describe this shadowed area in words as the intersection of the RGB colours on the screen or the area where no light from any of the light sources has reached. Therefore, the area can be modelled as $W-(R \cap G \cap B) = \emptyset$. We can further elaborate on this equality to verify the expression of the black area.

Resources

[1] Yurumezoglu K., Karabey B., Koyunkaya M. (2017). Shadows constructing a relationship between light and color pigments by physical and mathematical perspective. Physics Education, 52, 025008.

[2] Experiment Link: Yurumezoglu K., Karabey B. https://www.youtube.com/watch?v=hrQd62BmdQQ .

To find out more

Circe Magazine: STEAM Education (2019). http://www.circesfu.ca/wp-content/uploads/2019/01/CIRCE-STEAM-Magazine-FINAL-Jan12.pdf

Activity 2

Name of the Activity

Understanding Complementary Colours by STEAM Perspective

Aims of the Activity

In this section, respectively; designing STEAM-based instruction for gifted students; Activities for teaching complementary colours with STEAM and using the interdisciplinary approach in real life applications will be discussed. In addition, the activity, which includes the theory and application of complementary colours, will be examined in an interdisciplinary and technology-based perspective, integrated with physical, mathematical and artistic perspectives, respectively.

Description of the Activity

After performing the first activity, we can say that learners establish the relationship between light and pigment colours with shadow. However, the question of how the shadows of light colours can form the main colours of pigment colours arises as a structure that requires a more in-depth examination. Another important question is what kind of results can be obtained if this relationship is examined from an artistic point of view.

Complementary Colours From Physical Perspective

When we combine the pigment colours of cyan, magenta and yellow with the printing pastes in Figure 1(a), we produce the colours shown in Figure 1(b). Complementary colours for pigment colours are the colours that complete the mixture to create black. In this case, cyan is complementary to red, magenta is complementary to green and yellow is complementary to blue. Complementary colours for pigment colours are the colours that complete the mixture to create black. Here, we observe that the point where blue meets its complementary colour yellow, (the mixture of magenta + cyan) is black. This phenomenon depicts that the pigment colour yellow has absorbed the light colour blue. Similarly, the pigment magenta absorbs the light colour green (Cyan + Yellow), while the pigment cyan absorbs the light colour red (magenta + yellow). In other words, each filter absorbs the colour which is its complementary one. This simple experiment demonstrates that the reflection/transmission of colours is complementary to their absorption in the interaction of matter and light.

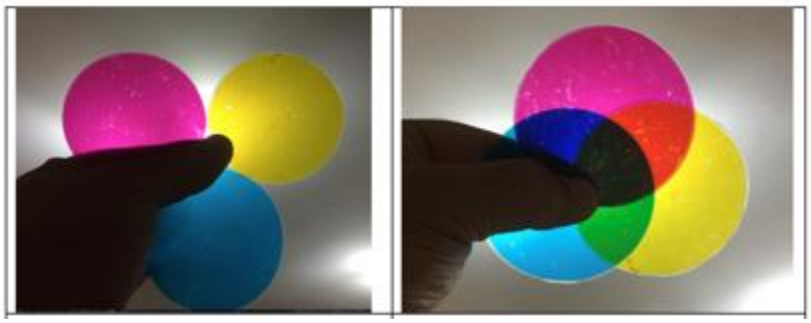

Figure 1(a-b)

1(a) Primary colour filters made with cyan, magenta and yellow printing pastes.

1(b) Secondary colours emerging by placing primary colour filters on top of each other and the darkest obtainable colour.

Observing Complementary Colours With The Help Of Technology

The Invert Colour feature found on smartphones and in the Photoshop program offers us the opportunity to teach the topic of complementary colours. We use the Invert colour feature to look at the mixture of cyan, magenta and yellow (CMY) that we can obtain with our filters. We observe that the colours turn into what we see in Figure 2. The colours appeared on the screen are the light colours red, green and blue (RGB) and their mixtures. Based on the complementary colours theory and with the help of a feature made available to us through technology, we can make surprising discoveries about the colours that an object will absorb in nature. An example was given in Figure 3(a)-(b).

Figure-2 The complementary colours of the primary colours and mixtures obtained with magenta, cyan and yellow pigments in the background, displayed with the Invert Colour feature on our smartphone

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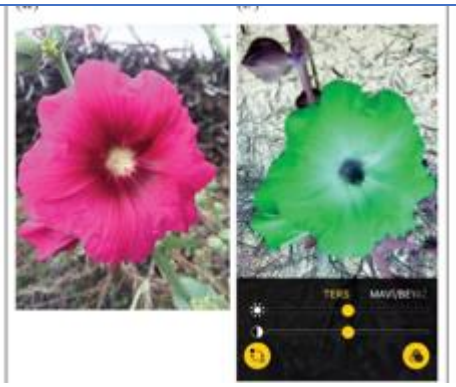
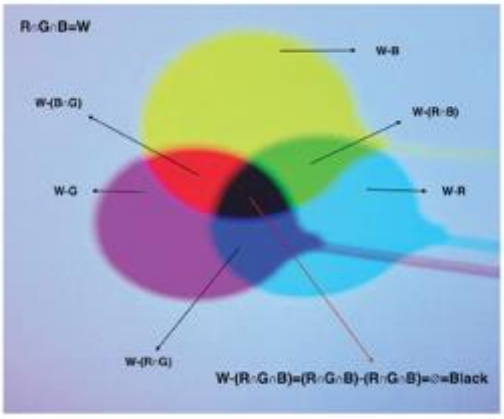


Figure 3 (a-b).

3(a) Colours reflected in a flower. 3(b) Colours (complementary) absorbed in the same flower

Complementary Colours From Mathematical Perspective



Expressing shadows in terms of sets. (Figure-4)

In Figure-4, the mathematical relationship between shadows and colours has been mentioned before. As we indicated before, for white light to appear on the screen, all of the primary light colours radiated from the sources must intersect. We can express this as an equation; W= R∩ G∩B. If we substitute the corresponding set in the equality W − (R ∩ G ∩ B) = Ø, we obtain the model for the absence of the white light (W) that shows the area of black/shadow. (R∩ G∩B) − (R∩ G∩B) = Ø Since the difference between a set and itself is an empty set, the black or unilluminated area shown in Figure 4 could be named as an empty set. A mathematical expression for the area that we are accustomed to perceive and call a dark or full shadow in daily life as an empty set creates a subjective interpretation of the observations. Also it provides a concrete and physical representation for sets and empty sets used so frequently in mathematics. The same operations can be done with all the colours in Figure 1, and we will obtain Table 1.

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Color (Set symbol)	Set	Complementary operations with sets	Complement color (set symbol)
White (W)	$W = R \cap G \cap B$	$W^c = (R \cap G \cap B)^c = R^c \cup G^c \cup B^c = \varnothing$	Black ($\varnothing$)
Magenta (M)	$W - G$	$(W - G)^c = (W \cap G^c)^c = W^c \cup (G^c)^c = \varnothing \cup G = G$	Green (G)
Yellow (Y)	$W - B$	$(W - B)^c = (W \cap B^c)^c = W^c \cup (B^c)^c = \varnothing \cup B = B$	Blue (B)
Cyan (C)	$W - R$	$(W - R)^c = (W \cap R^c)^c = W^c \cup (R^c)^c = \varnothing \cup R = R$	Red (R)
Red (R)	$W - (B \cap G)$	$(W - (B \cap G))^c = (W \cap (B \cap G)^c)^c = W^c \cup ((B \cap G)^c)^c = \varnothing \cup (B \cap G) = (B \cap G) = W - R$	Cyan (C)
Blue (B)	$W - (R \cap G)$	$(W - (R \cap G))^c = (W \cap (R \cap G)^c)^c = W^c \cup ((R \cap G)^c)^c = \varnothing \cup (R \cap G) = (R \cap G) = W - B$	Yellow (Y)
Green (G)	$W - (R \cap B)$	$(W - (R \cap B))^c = (W \cap (R \cap B)^c)^c = W^c \cup ((R \cap B)^c)^c = \varnothing \cup (R \cap B) = (R \cap B) = W - G$	Magenta (M)

Table-1. You can prove the accuracy of the mathematical operations in the table by using the Invert Colour feature of your smart phone.

These calculations could be done while teaching complementary colours in physics classrooms. For instance, as we describe above, a teacher can choose any colour from the first column of Table 1 and ask students to find the complement of that colour. In this point, students have to use equations related to sets. It is thought that this activity could be helpful to interrelatedly strengthen students' knowledge of mathematics, particularly sets, and physics, particularly complementary colours.

Complementary Colours From an Art Perspective

The use of complementary colours in Turan Enginoğlu's work (Figure-5 (a-b), Figure-6) has made the painting more vivid and colour-harmonious. The distribution of the complementary colours set a balance between reflection and absorption of light in the painting. The colours obtained by mixing the paints absorb the light, making the colours darker, while the complementary colours absorb the light less and produce light tones. Controlling the balance between the reflection and absorption of light when using the paint pigments could enable the artist to transfer his/her emotions onto the canvas. This is made possible by the artist's application of knowledge gained about the basic elements of complementary colour theory. The artists who have made their mark on art history have done exactly this.

Figure 5 (a-b)

(a) Turan Enginoğlu, flowers in a vase, 2007, oils on canvas, 70 × 100 cm, private collection.

(b) Complementary colours of 'Turan Enginoğlu's work'.

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Figure-6 . Complementary colours obtained from cross-sectional details on the painting, using the Invert Colour feature of a smartphone.

Resources

Karabey, B., Koyunkaya, M. Y., Enginoglu, T., & Yurumezoglu, K. (2018). Discovering complementary colors from the perspective of steam education. Physics Education, 53(3), 03500.

Yurumezoglu, K. (2009). An entertaining method of teaching concepts of linear light propagation, reflection and refraction using a simple optical mechanism. Physics Education, 44(2), 129.

Yurumezoglu, K., Karabey, B., & Koyunkaya, M. Y. (2017). Shadows constructing a relationship between light and color pigments by physical and mathematical perspectives. Physics Education, 52(2), 025008.

To find out more

Circe Magazine: STEAM Education (2019). http://www.circesfu.ca/wp-content/uploads/2019/01/CIRCE-STEAM-Magazine-FINAL-Jan12.pdf

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7. IMPLEMENTATION OF STEAM EDUCATION FOR GIFTED STUDENTS

Aims of the Learning Unit

This Unit aims to train teachers to put the curriculum into operation in a way that the eventual outcome is evidenced through the gifted students' performance in and outside the classroom. This Unit will include the provision of organized assistance to teachers in order to ensure that the newly developed curriculum and the most powerful instructional strategies are actually delivered at the classroom level. This lesson includes aspects related to accessibility, alignment to local contexts, professional development, evidence of effectiveness, and access to materials and practitioner support.

Description

The process of putting the curriculum to work in order to attain the goals for which it was created is known as curriculum implementation. The teacher's translation of the planned or formally designed course of study into syllabuses, schemes of work, and lessons to be delivered to students is referred to as curriculum implementation. The learner acquires the targeted experiences, information, skills, ideas, and attitudes that the curriculum is based on during implementation.

There are various factors that influence curriculum implementation such as the resource materials and facilities, the teacher, the student, the school environment, culture and ideology, and the instructional supervision and assessment.

- The student. Physical and cognitive disparities, as well as a variety of socioeconomic, linguistic, and cultural backgrounds, all contribute to students' distinct demands and talents in the classroom. Diverse students have equitable access to educational materials, instructional techniques, learning experiences, assessments, and communications from instructors when they are committed to developing accessible teaching and learning environments.
- The teacher. The teacher is the implementing agent of the curriculum. The ability and effectiveness of the teacher to carry out curriculum implementation depends to a large extent on variables such as knowledge/experience qualification, availability of resources and motivational issues among others.

At the end of this Unit, teachers will have the ability to understand and identify the main accessibility barriers and learning needs. Also, they will develop the skills to remove these barriers and create accessible and inclusive teaching and learning environments that ensure that diverse students have equal access to educational materials, teaching methods, learning experiences, assessments, and communications from the teachers.

In addition, teachers will understand, respect, and meet the needs of students who come from a variety of cultural backgrounds and will acquire the skills to use Culturally Responsive Teaching methods and contextualize knowledge to make learning effective. To achieve this,

teachers will understand what Culturally Responsive Teaching is and the benefits of creating culturally responsive classrooms where students bring their cultural differences, which will be respected, appreciated, affirmed, and validated. In order to reduce inequities in student achievement, teachers will learn to be culturally responsive and communicate high standards to all children, regardless of race, ethnicity, or cultural or language environment.

Additionally, teacher training is essential for all educators involved in the development and implementation of gifted programmes and should be an ongoing part of gifted educators' professional and ethical practice. Thus, in this Unit, teachers will also have the ability to access the different methodologies, tools and materials of continuing professional development to enhance their competence-oriented education, training and learning.

Lastly, the evaluation of teaching is a fundamental aspect, in order to demonstrate that the teaching approaches applied contribute to student learning goals. Therefore, in this Unit teachers will obtain the knowledge and will develop the skills to assess the effectiveness of their teaching approaches in contributing to student learning, to ensure that students are meeting their learning goals. In addition, this unit also includes a range of resources for practitioner support.

Methodology

The concept of curriculum implementation involves the dissemination of a structured set of learning experiences, the provision of resources to effectively execute the curriculum plan, and the actual execution of the curriculum plan in the classroom setting, where the teacher-student interactions take place. Thus, curriculum implementation entails the interaction of the student and the curriculum contents under the guidance of the teacher in order to acquire the desired knowledge, attitudes, abilities and skills. Curriculum can be seen as the vehicle that contains the goods, and the teacher as the driver who delivers the goods to the consumers of the goods (the learners). The classroom is therefore at the centre of curriculum implementation, and the teacher is the hub, providing content which leads to the achievement of the curriculum objectives and the success of the students.

Based on this concept of curriculum implementation, this Unit will provide the knowledge to understand the different learning needs of gifted students and will provide teachers with the skills and tools to create inclusive classrooms that effectively execute the designed curriculum.

Assessment

A series of evaluation tests will be provided to evaluate the implementation of the Unit 7 training course. Thus, through this assessment, educators will be evaluated on the basis of the following learning outcomes:

- The knowledge and skills to adapt/create accessible learning environments for gifted students by understanding their accessibility needs and setting accessible learning objectives that support students' skills and well-being.
- The knowledge and skills to adapt the STEAM curriculum to the specific local context.

- The knowledge and skills to update or develop additional competences through continuing professional development.
- The knowledge and skills to assess the effectiveness of teaching through evaluation tools addressed to colleagues or to students.
- The knowledge and skills to access appropriate supporting resources to maximize teaching strategies.

Tips for educators

All students should be empowered to learn and achieve, experiencing high quality teaching practice and the best conditions for learning which equip them with the knowledge, skills, and dispositions for lifelong learning and shaping the world around them. Some practice principles that teachers should consider are the following:

Positive climate for learning:

1. High expectations for every student promote intellectual engagement and self-awareness
2. A supportive learning environment fosters inclusion and collaboration
3. Student voice, agency and leadership empower students.

Excellence in teaching and learning:

4. Curriculum planning and implementation challenges and engages students
5. Deep learning challenges students to create and apply new knowledge
6. Accurate assessment practices inform teaching and learning
7. Evidence-based approaches drive professional practice improvement.

Community engagement in learning:

8. Learning in real-world circumstances promotes global citizenship
9. Parental and career partnerships help students to study more effectively.

References

A Whole-School Guide to Curriculum Planning. 2020. The Education State. State of Victoria (Department of Education and Training).

https://www.education.vic.gov.au/Documents/school/teachers/management/whole-school-guide-to-curriculum-planning.pdf

Centre for Education Statistics and Evaluation (2019), Revisiting Gifted Education, NSW Department of Education

https://www.cese.nsw.gov.au/publications-filter/revisiting-gifted-education

Center for Teaching and Learning (Columbia University). Accessibility Resources.

https://ctl.columbia.edu/resources-and-technology/resources/accessibility/

Employment, Social Affairs and Inclusion. European Commission. 2018. Access to quality education for children with special educational needs.

https://op.europa.eu/en/publication-detail/-/publication/b2215e85-1ec6-11e9-8d04-01aa75ed71a1/language-en

Solomon Bediako. 2019. Models and concepts of curriculum implementation, some definitions and influence of implementation. University of Cape Coast.

https://www.researchgate.net/publication/333338710_Models_and_concepts_of_curriculum_implementation_some_definitions_and_influence_of_implementation

Practical Activities

Activity 1

Name of the Activity
Crossing a river (9+)
Aims of the Activity
To encourage students to think about what it might be like to live with a disability. To facilitate talk about social inclusion.
Description of the Activity
1. Explain to the group that the goal of this exercise is to get the entire group across an imaginary, crocodile infested river safely, using only three pillows. 2. Have the 'river' be quite wide, say the width of the whole room, and use the pillows as movable 'stepping stones' to get everyone across. Participants are only allowed to touch the pillows, and not the floor, or else they are out. 3. Select a few people to simulate different disabilities such as being unable to use one leg or one arm, being unable to see, or perhaps unable to speak. You may also want to select someone to simulate an illness, perhaps by being only able to move at a certain speed or needing to rest between each action taken. 4. Once everyone has made it (or not) to the other side of the river, have the participants switch roles. Those in the group who did not simulate a disability should now do so, and vice versa, for the trip back across the river. 5. After everyone has made it (or not) back across the river, bring everyone together to debrief the exercise. This is an exercise about disability, but you can think of how to make a discussion about other grounds for discrimination and social inclusion. Possible discussion questions: • How difficult (or easy) was it for the group to accomplish this exercise? Why was it as easy or as difficult as it was? • How did it feel to not be able to use your whole bodies? • Can you think of the challenges that people with disabilities might experience every day? How do you think people with disabilities manage? • What about people who are chronically or terminally ill, people who live with a mental illness, or the families and friends of people with disabilities? What challenges do you think they face every day?

- What changes could we make in the way we think and talk about the world around us, about people, or perhaps in the way we plan different aspects of our community (such as streets and buildings) that might address some of those challenges?

Resources

Running Time: 30 - 45 min

- Needs lots of space, preferably outside.
- Three large pillows (or something similar to use as stepping stones)

To find out more

The People Power Manual and Facilitator's Guide, North Shore Multicultural Society, 2003.

Activity 2

Name of the Activity

Discrimination role play (12+)

Aims of the Activity

Expression of (insight into) the feelings attached to the various roles (victim, perpetrator, witness), working out and testing methods of conflict resolution.

Description of the Activity

Step 1: Divide the participants into working groups of 4 – 5 people. Task of the groups is to think about cases of discrimination they have experienced or heard of and to choose the most representative or interesting one. On the basis of these cases the group has to develop a dramatic scene, which should contain at least one discriminating situation.

Step 2: Ask the working groups to present their scenes to the rest of the group.

Option: The activity can be modified by offering the members of the audience the chance to enter the scene and replace witnesses or victims to find alternative or "better" solutions. It is important that at one time only one person should enter and only one person can be replaced. A person wanting to enter the scene has to indicate this by shouting "Freeze". After replacement of the figures the trainer shouts "Go!" and the role play continues.

This modification is very effective but extremely time consuming as the role play has to be repeated several times to offer everybody an opportunity to enter the scene.

Step 3: Discussion and debrief. Reflection should be on the situations presented, on the role of the victims, the perpetrators as well as the role of potential witnesses – and on the solutions presented to overcome the discriminatory situation.

Resources

Running Time: 60 – 100 min; depending on group size, bear in mind the timeframe for the optional broader approach of including everyone in the theatre of the oppressed.

Preparation: The educator could provide suggested cases or themes for the scenario; this also saves some time.

It is important to create a safe environment and not push people to assume any role (stop rule).

Make sure that there is a role for everybody in the group.

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To find out more
Schindlauer, Dieter et al, Manual for Trainers, Workshops to Counteract Discrimination, 2006.

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