# STUDENT ASSESSMENT IN THE 21<sup>ST</sup> CENTURY

A new mindset towards supporting student competences development in an inclusive way.



Empowering Teachers to Design Innovative Assessment Tools in a Digital Era



# **Empowering Teachers to an inclusive and meaningful assessment in the 21<sup>st</sup> century**

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# Innovative Assessment Framework [2021]



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# Table of contents

Why talk about innovation in assessment?	2
The need to innovate in the 21 <sup>st</sup> century education	2
But then, how do we assess students in the 21 <sup>st</sup> century?	2
Student assessment: Is it important?	3
Weiner's attribution theory and the Pygmalion effect on the importance of student assessment	4
Developing a growth mindset	5
Diversity, Equity and UDL in Education	7
Are we designing education for the average student, or for no one?	7
Diversity in education	8
A short note on neurodiversity	8
The role of Equity and UDL in education	9
The Universal Design for Learning	10
Gender balance in education	12
Personalized and differentiated learning	14
Learning Styles and Multiple Intelligences	14
Assess to compare, or to improve?	15
Assessing students in the 21 <sup>st</sup> Century	16
Summative assessment	17
Formative Assessment	18
Assessing Skills	19
Assessing students' knowledge	21
How to design an effective assessment	21
Rubrics for Assessment	22
Checklists for Assessment	24
The ASSESS student assessment method	25
Assessment in different learning and teaching methods	26
Privileging dialogic and democratic assessment methods	27
The Design Thinking approach to design an effective assessment	28
Transparency and co-creation with students	32
What do teachers think?	33
Conclusion	33
References	34

# Introduction

Student assessment needs a revolution and the ASSESS project aims to be part of it. Student assessment must stop acting as a hindering factor in school education, promoting anxiety, fear and competition and should be transformed into a tool for the promotion of development and well-being.

In this document we introduce the main concepts and ideas integrated in the ASSESS student assessment framework and we proceed to then give a concrete idea of how they can all be integrated into a meaningful assessment methodology.

If you are interested in learning more about these concepts in an interactive format, you can access our online course (MOOC): <u>https://assess.nuclio.org/online-course</u>





# Why talk about innovation in assessment?

## The need to innovate in the 21<sup>st</sup> century education

Innovation in education is a widespread concept. With the accelerated technological growth in society, developing education has become ever more important. New teaching and learning methodologies are being developed every day and teachers all over the world are receiving training to update their practices.

What we call today "traditional education" (the standardized and expository teaching method) was once created to teach very specific skills and knowledge that students would then apply in very specific lines of work where they would probably work throughout their lives<sup>1</sup>. Students' future was then more or less predictable. However, the world has evolved and the future perspectives of every student entering school are now different, more fluid and even unpredictable<sup>2</sup>. Trying to prepare students for specific lines of work or asking them to sit in front of a teacher exposing isolated pieces of information has become obsolete and very ineffective.

With the wide use of the internet and search engines, knowledge is today available freely to anyone with a smartphone or other digital device. Ask any teacher if there is something from their curricula that they cannot find online and see what they answer! Every piece of knowledge and information, be it valid or fake, is literally just one click away for students and this brings us two new challenges: 1-If what we teach is already available to students online, we need to start focusing on updating our teaching and focusing on learning goals more adjusted to our current social and economic dynamics and 2-Students today are bombarded everyday with both valid and fake information and may not have the necessary tools to distinguish one from the other, increasing the level of social miss-information worldwide.

So, this leads us to the conclusion that instead of exposing students to vast lists of information and asking them to memorize, facing the risk of disengaging them from their learning experience, our focus should be on something else. We must develop new ways of teaching and learning that leads students to learn how to learn, how to distinguish valid from non-valid information, how to critically think, how to be innovative and creative, how to communicate, how to be tolerant and respectful, etc.<sup>3</sup> This is how we truly prepare them for their future.

### But then, how do we assess students in the 21<sup>st</sup> century?

In the previous section, we have established that innovating in education is fundamental and the shift in the school system is necessary and should be reinforced. However, with so many innovations in teaching and learning taking place, teachers are often challenged when it comes to assessing their students. This is understandable. If teaching and learning is becoming more diverse, fluid, and personalized, it is easy to understand that each student might follow a slightly different learning path and while developing similar skills, the knowledge they acquire in as specific task might be also different. **Student-centred approaches are more personalized by nature, leading do diverse learning pathways within the same class and within the same activity.** 

This all leads us to two important questions:

1. How can the current standardized assessment practices be effective in a personalized and diverse learning experience? (If students learn different things

and develop different skills, one equal assessment for all, might fail to properly assess them miserably)

2. What is the added value of assessing students' memorized knowledge in an era where knowledge is accessible with any digital device and developing skills is the key to success?

The answer to both questions is the same: We need to revolutionize student assessment and shift the whole mindset around its purpose, its importance, and the way of doing it. Assessment in the 21<sup>st</sup> century must be personalized, inclusive and must focus on the development of skills much more than on the memorization of knowledge. It needs to embrace human diversity and allow students to discover their inner strengths, promoting their unique potential. It should not be judgmental, and it should not be final. It must be constant and in the form of a fluid exchange between student and teacher and students with themselves.

A proper assessment allows students to acquire a growth mindset and a life-long learning mentality, while it helps teachers to understand the effectiveness of their methods, adjust when needed and improve in their career as well.

In this document we aim to explain in detail one possible way of achieving such innovative student assessment and bring forth an effective holistic assessment framework.

### Student assessment: Is it important?

When we ask teachers why they assess their students, the answer might be surprising. Although some have reflected about the importance of student assessment, we often see them with puzzled faces and get answers like: "I don't know" or "because I have to". We might also hear: "To give them a score", "To compare and rank them", "To see if they have learned", and a few rarer times we may listen a teacher say, "I assess my students to help them learn and to know if I am doing a good job".

Student assessment is such an integral part of the teaching and learning experience that many never question why it is there and what purpose it serves. And when they do, the answer is not clear. So, why do we assess students? Is student assessment really important?

Looking at the most common test-based standardized ways of assessment, one can question if there is any purpose to it. If we think about it, in a world where such a diverse set of skills is necessary to thrive and where information runs freely on the internet, what is the purpose of assessing students' ability to memorize isolated pieces of knowledge? Furthermore, when companies are looking for employees that can quickly learn new skills, think critically, be adaptable, proactive, creative and problem solvers, what does a numbered grade on a standardized test really say about a person's ability to succeed?

The truth is assessment as it is widely seen in schools today, may have little or no importance, other than to compare and label. But a proper assessment can be key for a successful learning journey, the development of important skills, a growth mindset, and the uptake of a lifelong learning mentality. If students realizes that learning is a process that can be improved through awareness of strengths and weaknesses and finds a supportive system to guide them, learning becomes easier and much more effective.

If approached in the right way, **assessment can be a powerful tool for learning**, selfdevelopment and positive communication between teachers and students. It is through an effective assessment approach that students can gain awareness of their progress and decide on what needs to be improved. It is also through assessment that students can regulate their learning and become in control of their development<sup>5</sup>. An effective assessment approach can boost students' self-confidence and self-control, while minimizing the social discomfort of being consistently pressured and compared to their peers, improving the overall social environment as well in the school. Furthermore, a proper assessment, based on a constant exchange between teacher and student, is key in the teachers' own regulation, enabling the constant improvement and adjustment of their teaching methods. Finally, a proper assessment can bring light to the importance of diversity, namely, human diversity and the added value of working with the different strengths and traits of a class, instead of pushing all students to succeed in the same way.

# Weiner's attribution theory and the Pygmalion effect on the importance of student assessment

We all tend to find a reason for our successes and failures. We either consider that a certain event happened due to our own actions and abilities, or we may think that external factors have influenced the outcome. Moreover, we may think that things happened in a certain way, due to something that will not change and that we cannot control (be it internal or external) or due to a factor that is within our reach to change. These are what has been called Attribution theory and it has a very relevant role in education<sup>6</sup>. For example, if a student failed on a specific test, they could attribute this to several different reasons:

- They can "blame" their own ability and consider that they are just not good enough (internal and fixed reason), hence they never will be and might stop trying.
- They might believe that they failed because they didn't study enough (internal reason, but not fixed reason) and next time will be better, so they keep their motivation and effort.
- They might consider that the exam was just too difficult (external reason) either believe that next time will be easier (not fixed) and keep their motivation, or that all tests from that subject domain are just too difficult (fixed) and consequently, lose all motivation to keep improving.



These attributions have a very strong impact on students' self-esteem and motivation related to their education (and beyond). While there are many factors that influence how these attributions are formed, namely the education students receive at home since they are

born, teachers also have a very relevant role in this. While it is inevitable that we all form these self-attributions, with proper guidance, if necessary, we can rebuild our internal reasoning and build more positive self-attributions and concepts. It has been shown that teachers' attitudes towards students, have an influence on the adoption of these attributions<sup>7</sup>, and thus, a very relevant impact on students' motivation. Furthermore, it has been shown that when a teacher expects a student to succeed, this student will have a better chance of doing it. This has been called **the Pygmalion effect** and many studies have shown it impact on students' outcomes<sup>8</sup>.



These theories together can describe what we can call a "self-fulfilling prophecy". This is, what a person believes about themselves affects the whole course of their life. As Henry Ford once said:

#### "Whether you think you can, or you can't, you're right!"

As such, with these two theories, we consider that a proper assessment framework is important in modulating the interactions between teachers and students and is key in the adoption of a strategy that can regulate students' cognitive perceptions about the world and themselves.

A positive and effective assessment can promote the development of students' resilience and self-confidence when faced with challenges and mistakes, promoting what is called a "Growth mindset".

### **Developing a growth mindset**

Assessment has a great effect in students' mindset. If students are assessed based on their outcomes, they will learn to value the outcomes much more than the process itself. This can be a very unstable pilar in their learning since the outcomes are not always what we expect them to be. Instead, if students are assessed based on their effort, their attitudes, and progression, they more easily value the process and reap more benefits from it.

Learning that making mistakes is part of any process is a tough lesson, but one that should be learnt from an early age and supported by the school system. Understanding that success and development come with effort and resilience is a key pilar in human life. If students believe that intelligence and skills are fixed, then they will also believe that there is no purpose in trying to improve. However, if they understand that they can learn from mistakes and that their internal assets can improve through their own efforts, then they will be more intrinsically motivated to invest in their learning.

This is what a **Growth Mindset** is. It is **knowing that our skills are not fixed, and we have in our own hands the power to learn, improve and develop**. As such, focusing on students' progress instead of comparison against "standards" helps foster this growth mentality. Directing student assessment toward the process of learning is a powerful way to boost students' confidence and self-belief and to promote the resilience they will need to thrive in life.



Furthermore, if teachers themselves adopt a growth mindset and understand that they too can progress, improve, and continue learning, they naturally start interacting with their students in a way that can promote this same mindset in them.<sup>9</sup>

An effective student assessment can support students' **intrinsic motivation** to learn, which in turn promotes an increased engagement and motivation as well as a deeper processing of information and a cognitive level<sup>10</sup>. In other words, if students believe in themselves, are not afraid to face their failures and are self-motivated to learn, their whole neurological system becomes more "open" and prepared to "absorb" the information and develop all the necessary skills to grow and overcome challenges.

In conclusion, student assessment is very important and shouldn't be undervalued, but it needs to be redefined to act as a motivator of learning and development of both teachers and students. It must consider the principles of Equity, Diversity, and Inclusion, it must focus on the development of the skills that students will need to thrive in their future and it needs to be holistic, i.e., it needs to look at students not only as individuals learning but as human beings with a specific social, emotional, and cognitive background. Finally, student assessment should boost students' confidence in themselves and build a life-long growth mindset that fosters resilience and the long-lasting search for growth and development.

# Diversity, Equity and UDL in Education

Every living being is unique. From plants to animals, no individual is the same. Diversity is what keeps species evolving and adapting to a constantly changing world. Scientists and activists have been advocating for the protection of biodiversity for a long time, in the fight for sustainability and an eco-friendlier behaviour from humans. Diversity is what keeps ecosystems resilient and strong, and it is also what makes human populations thrive and evolve. It is diversity that we can find innovative solutions to new problems, adjust to the constantly changing societal needs and build strong pillars for sustainable development.

Imagine a world where all humans were the same, with the same strengths and weaknesses, with the same thoughts, visions, and ideas. How suited would we be to solve a problem that required new ways of thinking? How would we manage to cope with a situation that needed us to be strong in a field where we were weak? **Diversity ensures that where one individual might be weak, another is strong and vice-versa. It is the key pillar of our strength as a society, and it should be celebrated and preserved!** It is through diversity that we can succeed and yet, in many ways our society and education systems still create barriers for diversity and reward the pursuit for the standard the "norm". One such way is the wide use of standardized assessment tools and methods. Assessing students as if they were all the same is far from being an equitable action and may leave behind many brilliant minds that simply don't know how to succeed in standardized tests.

### As Dr. Diane Ravitch, former United States Assistant Secretary of Education said in 2021: **"Sometimes, the most brilliant and intelligent minds do not shine in standardized tests because they do not have standardized minds".**

### Are we designing education for the average student, or for no one?

In 2002, Dr. Michael B. Miller from the University of California conducted a study to map the brain activity related to episodic memory retrieval. In his study he scanned brain activity in 9 individuals and then used these "brain maps" together to create a common, average map. By the end of the study, one very important finding was that the artificial average map had nothing to do with any of the individual brains and did not represent accurately any of the real individual brain activity<sup>11</sup>. Dr. L. Todd Rose, Lecturer on Education from Harvard Graduate School of Education builds on this study and explains in his talk "The End of Average" (search on YouTube: https://youtu.be/9GcJi4eaSeY), that when considering the human brain, we cannot work with the "average" because as studies have shown, "*the average represents no one*" and "*there is no such thing as an average student*"!

So, how can we possibly succeed in an education system where everything is designed for the average? If rooms are designed for the average, if time for learning is decided based on an average, if assessment methods are created for the average, is education really designed for most or is it designed for no one? As Dr. Todd Rose says closing his talk: "*I'm not saying that simply overcoming our mental barrier of average will solve all of our problems in education...but I am saying that it is a necessary first step and it is the only way that we can build an education system that can nurture the potential of all students".* 

So, it is a very important goal today to increase awareness about the importance of equity and diversity in education, to reverse this notion of "average students" and "standard methods" and to guide teachers and school staff to promote diversity and motivate diverse ways of thinking, of being and creating in the school. This can be achieved using more diverse and equitable teaching methods, the promotion of diverse groups in class, the creation of an equity and diversity mindset in the school and the adoption of teaching learning and assessment methods and tools that accommodate and reward diversity.

### **Diversity in education**

**Human diversity** refers to the way people differ from each other, from physical and cognitive characteristics to and social and cultural backgrounds. While diversity can be considered in multiple dimensions, the OECD (Organisation for Economic Co-operation and Development), for example, considers the following dimensions of diversity to be the most important in the context of education<sup>12</sup>:

- Gender, gender identity and sexual orientation
- Ethnic groups, national minorities, and indigenous peoples
- Migration
- Special education needs (including ADHD, Autism, Dyslexia, OCD, etc.)
- Giftedness

Each of these domains includes very relevant aspects of students' everyday lives and are often the source of prejudice, discrimination, and bullying. Regardless of student's cognitive abilities, this "threatening" environment leads to serious academic and emotional consequences, impairing student's performance and learning ability<sup>13</sup>. It also leads to a feeling of not belonging and a low self-esteem that if left untreated, may impact the rest of their lives. If students go to school to become prepared for their future, this is something that must not happen, and schools need to overcome these barriers and offer ALL students the opportunity to feel safe and to develop to their full potential.

As we can see, diversity issues are very relevant and are today the target of a wide number of projects, policies, and initiatives at an international level. Awareness is increasing for the importance of non-discrimination and the fight against stereotypes.

However, in education we must go one step further into this dynamic and consider diversity as an intrinsic part of human nature. We don't need to belong to a specific "group" to be diverse. We don't need to express our sexuality or gender differently, to be considered different. We are all different and often this seamless difference is also cause of discrimination and threat. How many times has a student felt left out or judged for expressing an idea that was different or "weird"? How often did they feel embarrassed for saying the wrong answer out loud in class and being criticized by a teacher or made fun by of colleagues?

# How many great ideas have been left unexpressed in the world for fear of judgement or discrimination?

Diversity comes in many forms and schools should be a safe place for everyone to express their truest nature and their craziest and weirdest ideas, because it is from them that the most creative solutions to human problems are born.

### A short note on neurodiversity

Neurodiversity refers to diversity in the way the brain processes information and responds to the world. This term is usually used as an "umbrella" for what are considered learning disabilities like Attention Deficit Hyperactive Disorder, Autism, Tourette Syndrome, Obsessive Compulsive Disorder, Dyslexia, Dyscalculia, etc. However, not all neurodiverse individuals face the same challenges and many even go unnoticed through life<sup>14</sup>.

A student with Autism or with ADHD, for example, may go through their education years without noticing significant learning disabilities and maybe just feeling different or "weird",

sometimes shining in some or all subject domains while often barely succeeding on others. They may feel that school is more challenging to them then for others and attribute this to personal failures or feeling they are just not suited to learn. They may be teased by their colleagues for being shyer, or completely restless and never suspect that they might fit into the neurodiverse spectrum.

This poses to education a complex and almost contradictory challenge:

- On one side of the coin, it is important that teachers and education systems are prepared to identify these cases, to provide proper counselling and guide students into finding the correct attributions to their challenges (preventing them to build a low self-esteem and poor image) and develop the correct mechanisms to overcome them.
- On the other side, education should be prepared to make all students succeed, regardless
  of their diversity, ensuring that there are no barriers, no matter if they are neurodiverse or
  what type of neurodiversity they may have (not excluding here the need for specific
  accommodations and support whenever needed).

In conclusion, teachers must adopt teaching and assessment methods that accommodate for all types of diversity and give room for each student to learn and express themselves in their own unique way. This can be achieved through the adoption of an equitable strategy and with the support of the principles of the Universal Design for Learning, which will be explained further in this document.

# The role of Equity and UDL in education

**Equity** in education considers human diversity and aims to ensure that all students have the same opportunities to achieve their full educational potential, regardless of their differences. It aims to create **educational systems with no barriers** that marginalize, exclude or discriminate students and by doing so, it fosters the development of important personal and

interpersonal skills and the sense of belonging in their community<sup>12</sup>.

Including Equity in education means that no student will feel marginalized for being or feeling different from others. It means that the notion of "standard" and "norm" must be deconstructed and the whole mindset in the school change so that all students encounter the same opportunities. In other terms, if we once thought that in school "the rules must be the same for all" to be fair, today we know that in an equitable education system this is far from being true.



Each student and each teacher have a different set of needs and education is only fair and successful if these different needs are successfully met. In sum, as any human can only truly learn and grow on a safe environment, by providing all students an emotionally and socially safe space, schools become the stable pillar for growth and development that they should be.

This means that teachers need to understand the diversity existing in their class and to provide different tools for their students to learn and to express themselves, according to their own needs. Instead of using only one standard way of promoting learning and one standard way of assessing students, the more diverse teaching and assessment are, the easier it is for

students to find the tools that better adjust to their needs and the better they can learn, develop, and succeed.

When thinking about this, many teachers feel overwhelmed and don't know how they could possibly provide all the necessary tools and means for each and every student to have their needs met. It seems only impossible, and they consider it better to not even think about it. This is very comprehensible. If a student has over 100 or 200 students, and heavy curricula to deliver and an assessment to make at several stages of the process, it isn't humanly possible to create a different method to teach and assess each student. That is completely right and that is definitely not what needs to be done!

The first thing that needs to be done is a shift in the mindset of teachers and school staff towards diversity. This can seem like a very simple and non-consequential thing to do, but in truth it is the major and most important step that can be taken. As we have explained in this document, teachers' attitudes toward students have the power to shape their development and their self-conceptions. As such, by embracing a diversity and equity mindset, teachers open the "space" for each student to express themselves without judgement, to discover their different potentials and use them to improve the learning experience of all.

If we are talking about student assessment, for example, in an equitable approach, if a student has difficulty in writing but excels in oral presentations, there should be no barrier for this student to use an oral form of expression, even if all others prefer a written way. By opening the options for students and giving them the opportunity to express their learning and development through different ways, teachers are automatically opening the doors to diversity and embracing the differences as a positive aspect of education. In sum, when designing an assessment, the teacher must consider if any student will be excluded or find barriers related to the content, the schedule, or the chosen methods, and if so, find alternative ways to promote an equitable approach<sup>15</sup>.

The same goes for the teaching methods chosen by teachers. When exposing information to students, for example, if teachers use only oral expression or choose to just ask students to read a text, they are limiting the options and considering a standard that may even not exist. However, if the teacher reads a text, shows a video, invites students to read a chapter of a book, research on the internet and listen to a music about the topic (for example), the options are so wide that students are much more likely to find a tool that promotes their best way of learning. By doing so, even if not knowing their audience at all, teachers will automatically be substantially more inclusive and equitable in their teaching.

### The Universal Design for Learning

The Universal Design for Learning (UDL) is an educational framework that considers human diversity and provides teachers with support and guidelines to diversify their practice in a way that eliminates barriers to any individual (promoting equity in education). It envisions an education design that is adequate for all, regardless of their differences. It was first developed by two researchers from Harvard School of Education through an initiative called CAST – Centre for Applied Specialized Technology (<u>https://www.cast.org/</u>) with the aim to revolutionize the design of learning environments, so that they would be suitable for all individuals, regardless of their differences or existing specific needs or disabilities.

It was born from the idea that instead of developing learning environments and activities that are suitable for "most" students and then arranging adaptations for a few students with different needs (a strategy that possibly would not be optimal for "most" anyway), teachers should design activities that are suitable for all at the same time. Think about a shop or a supermarket, for example, they are most successful if designed in a way that all individuals can access it, regardless of their existing or non-existing disabilities. Another example is the use of ramps to allow a person with a physical disability to cross a street without encountering the barrier having to go down and up a step<sup>16</sup>. This simple accommodation removes a huge barrier to a person with a disability, but it becomes much better as well for a person riding a bicycle, a skateboard or roller skates. It also becomes much better for a person pushing a baby stroller or a kid pushing a toy with a string. It was under this consideration that the Universal Design for Learning was born. It arose from the fact that "what is essential for one, is actually also better for all"<sup>16</sup>.

A teacher that specialized in special education but decided to use the same accommodations in their regular classes will most probably say that they were surprised to see that ALL students benefited from this more diverse and equitable environment and their learning improved, as their needs were in general much more easily met.

The Universal Design for Learning (UDL) framework is very well explained in the CAST website: <u>https://udlguidelines.cast.org</u> and to learn about it more in depth, we advise teachers to navigate and explore the tools and guidelines. It focuses mainly on diversifying the teaching methods and using:

- Multiple means of engagement (1<sup>st</sup> principle)
- Multiple means of representation and (2<sup>nd</sup> principle)
- Multiple means of action and expression (3<sup>rd</sup> principle)

These principles are connected to the brain's executive functions which are essential for learning and development of skills and work differently for each student<sup>17</sup>. For example, not all students have the same previous knowledge, experiences, and interests, which leads them to engage in a learning experience differently. Providing diverse ways for engaging with a new learning experience is therefore extremely important. Furthermore, students have different pathways for processing and expressing information and different patterns of brain activation. This means that each student has a specific and personalized way of learning, processing, and memorizing information, making it essential to provide diverse ways of interacting with the learning and assessment in class.

In Sum, UDL fosters the multiplicity that should be inherent in education. In ASSESS we don't intend to deeply explore and use the UDL framework in its full sense. We will not dive deep in the three main domains and use its checkpoints, but we intend to embed the mindset behind it and uptake its main features for an equitable and diverse student assessment. In this sense we aim to foster:

- The active participation of students in their assessment design and application (consider students' opinions, views, and personal goals give them agency over their learning journey and they become substantially more engaged).
- The offer of multiple means for engagement in the assessment moments (discussions with teacher, use of the assessment tools for self-assessment, regular access to the teacher's assessment, opportunity to give feedback to teacher, safe space to argue about ones' own assessment, etc.).
- Varied ways of collecting assessment evidence and providing diverse ways of expression in the assessment (allow students to choose from multiple ways to express their knowledge and development – through a written composition, an oral presentation, the development of a project, the design of a prototype, the filming and editing of a video, through games, a test, a performance, etc.).

- The use of diverse tools to teach and allow students to choose from multiple existing tools to learn, create and express the knowledge (ex. Videos, slide presentations, movies, songs, games, books, visits, talks, podcasts, etc.).
- The creation of a safe space for expression and development raising awareness for the importance of diversity, allowing students to express themselves without judgment.
- The promotion of the development of a growth mindset (the awareness that growth is achievable through effort and that skills and talents are not fixed but can be improved through life).
- The awareness that even when offering such diverse education environment, this might still not work for some student and the teacher can readjust the method according to the specific needs and challenges presented on the moment.
- The understanding that there is no such thing as an average or standard student and the adoption of a fluid attitude towards teaching and assessment (being open to necessary changes and adjustments), while still focusing on the intended goals.

## Gender balance in education

This document has already explored the diversity in education to some extent and it is not our intent in ASSESS to dedicate a special focus on any specific form of diversity, so much as to see students as unique in all their forms. However, we do believe that it is important to raise some awareness regarding the importance of seeing students beyond their gender or gender identity and for this reason we added this section to the framework.

The issues around gender equity are of great importance and many policies and projects are today oriented to create a more gender balanced world with equal representation of both men and woman in education and employment. This importance comes from the major gender disparities that have existed for a long time in the access to opportunities, between genders and an underrepresentation of woman in many social and economic fields.

According to several OECD reports, when compared by gender, in many OECD countries girls seem to generally perform better than boys in several education fields, such as reading for example and are more likely to pursue higher education than boys. At the same time, boys show a higher tendency to be repeat a grade and are less likely to complete upper secondary education than girls. However, despite this tendency, somewhere along the way there is a shift and men seem to have a higher probability of achieving a doctoral degree, enter a STEM field of study, pursue a scientific career than woman. Furthermore, across the OECD countries, general employment rate of woman is lower than men and they tend to earn less than men regardless of their education level<sup>18,19</sup>.

As we can see, gender disparities are already existing in early school education, and probably begin as early as the first stages of child development, through the stereotyped choice of toys, movies, books, and other inputs related to the child's sex<sup>20</sup>. This impacts both boys and girls and has important emotional, cognitive, and social consequences for them.

From the moment they are born, students are regularly exposed to sex/gender stereotypes which shape their view of themselves and of others. Although these stereotypes may seem harmless when we think about 6- or 7-year-old students, they are not and the consequences throughout life may be much wider than we can understand.

Gender stereotypes limit a child's view of the world and narrow their notion of self-potential to half of what it could be. Any kind of gender-based segregation teaches students that the world is not fully for them, but only half of it is at their disposal based on the sex with which they were born. How many times have we received or transmitted messages like: "pink shoes are just for girls and skateboards are for boys", "make-up or nail polish is for girls and space-

themed clothes are for boys", "playing with dolls, pretending to iron and practicing parenting is for girls, while exploring super-hero abilities and pretending to be a firefighter is for boys"?

Children learn how to be humans by playing and by interacting with the world around them. So, we need to consider the powerful (even if subtle) messages that the gender stereotypes have in limiting their growth and development. We must think about **how much our kids are missing out on life; how many hidden sparks and abilities are left uncover from restricting their exploration of the world to a culturally invented gender norm!** What would happen if suddenly all the options were available to all students, regardless of their gender?

Gender balance is an issue that must be considered with awareness in school education. Students enter school with many preconceived ideas about diversity, and more specifically about who they should be based on their gender. Although school cannot and should not erase the education that students receive at home, it does have the responsibility to educate for awareness and for critical thinking. Schools must provide the balanced and diverse environments to allow students to develop beyond their preconceptions and achieve their full potential.

By exposing students to a gender balanced environments where they are not segregated, excluded, or benefited based on their gender and where discussions and activities are gender diverse, schools promote the enrichment of student's experiences beyond those imposed by stereotypes.

We all have these unconscious biases, and it is normal to act in stereotyped ways without even realising it. However, teachers have the power to shape students' attitudes and views of the world and it is very important to gain awareness of such preconceptions.

For this reason, in ASSESS we invite all teachers, staff and all those involved in education to gain awareness about their personal biases and to make regular checkpoints to reflect on their attitudes and think: Is my attitude towards my students being influenced by a culturally imposed gender norm or a pre-existing stereotype? And if so, we encourage them to reconsider and adjust their ways. Simple things like separating students "boys to one side, girls to the other" have a profound impact on students' identity and notion of self-send them the wrong message that their potential lies influenced by their gender identity.

Examples of gender biased attitudes that we can have as teachers and should change are:

- In a hands-on activity asking boys to do the "hard work" like carrying things or building things using constructions tools and then asking girls to draw or paint. In fact, all the tasks should be open to all students, and they should choose where they fit in better according to their talents and interests and not to their gender.
- In an artistic activity encouraging girls to dance and boys to play music. All students should be involved in all parts of the artistic creation.
- Giving detention or reprehending all boys because some boys misbehaved but leaving girls out of the matter. This not only is unfair but sends the wrong message that what connects students to each other is their gender.
- Making teams "boys" vs "girls". When doing this, each team is missing out on a huge deal of diversity and again is sending the wrong message that what connects students is their gender.
- Using videos or images that portrait only one of the genders in any given profession. For example, using pictures of women when representing parenting or household care and using pictures of men when representing professions like space exploration, police officers or scientists. Both genders can excel in all areas of life,

so all videos, movies and pictures used in class must represent equally both genders.

• Etc.

Students are complex individuals with their ups and downs, with their strengths and weaknesses and although it is normal that in certain ages they naturally connect more strongly with peers of the same gender, schools should not reinforce or impose this. On the contrary, schools should show students that what connects them is who they are, their histories and what they want in life and gender is just one of several ways that make them diverse.

A simple checklist to help to checking if educational activities are gender balanced can be found here: <u>https://assess.nuclio.org/an-innovative-assessment-framework</u>

### Personalized and differentiated learning

Everything we have been describing so far in relation to Equity and Diversity leads us to the conclusion that education, as well as student assessment must be personalized to each student's needs in order to be effective. This doesn't mean that every teacher needs to offer a different education or assessment to each individual student ... that would be a daunting task! Instead, we have concluded that adopting methods that are diverse and versatile is the most effective way to provide an education that fits all. A personalized education is one that looks at each student as a unique individual and accepts their talents and needs as much as any others. It is an education where students are encouraged to be themselves instead of conforming to norms that don't suit their personality, skills or talents. It is more a mindset that teachers and the whole school community must adopt, rather than a radical change in education. And this is the idea we aim to achieve in ASSESS.

### Learning Styles and Multiple Intelligences

When we talk about personalized learning and UDL it is common that the theories about learning styles and multiple intelligences arise. Learning styles theory proposes that each student has different preferences when learning and engage more successfully with a certain type of information than another. One of the most commonly used models, the VARK model designed by Neil Fleming in 1987 and used in many studies from them until now<sup>21,22</sup>. It describes four main learning styles: Visual, Auditory, Kinaesthetic and Reflective. In simple words it theorizes that each person might learn better from interacting with 1. visual information, like images, books, videos; 2. Auditory



information like being read to, listening to someone explain, explaining something themselves, listening to podcasts, etc., 3. Tactile information and interaction, this is, working hands-on, feeling, touching, etc. or 4., Through reflection, solving problems, thinking, etc. These styles intersect with each other, and each person can prefer more than one. This theory is usually referred to when promoting the importance of multiple means of representation and variety in the learning settings.



Multiple Intelligences theory, developed by Howard Gardner in 1983 theorizes that the most common notion of intelligence, measured by IQ, does not encompass all exist<sup>23,24</sup> intelligences that types of According to the theory individuals can be intelligent in 8 different dimensions, being there: Verbal/Linguistic Logical/Mathematical, Visual/Spatial, Bodily/Kinaesthetic, Musical, Interpersonal, Intrapersonal and Naturalistic. The most important take away from this theory is that even if a student does not excel in the most commonly dimension of intelligence (Logical/Mathematical), they can excel in several other fields and schools should take this into consideration.

These two theories usually mentioned when discussing how students differ from each other in the way they learn and when attempting to adjust learning to their different needs. However, much controversy exists around these them and many studies and papers present data that either support that they are valid or that they are not.

In ASSESS we will not attempt to support or disproof these theories. We understand that because diversity is such a natural part of being human, it is very easy to accept these theories as valid. They are claiming that we are all different, and we are. A student might be failing in mathematics and still be a genius song writer, or an excellent decorator, or even a very talented fiction artist. Also, when learning new material, one student might prefer to read a book about the subject, while another student might get extremely bored while reading a book but would love to hear a podcast while riding a bike. Furthermore, maybe this is fluid and shifts with time or context. The student that loved to read about one issue, maybe now is very interested in listening a podcast or watching some YouTube videos about another. The key is in Variety!

So, in ASSESS we do not attempt to categorize diversity or create a level of organization that labels this diversity. Instead, we accept that we are all different and the more diverse is the offer, the more easily it meets the clients' needs, and by clients we mean students. These theories do, however, help us reflect on how diverse the human mind is and can be very useful when considering in what different ways we can engage students when setting up an educational activity or an assessment methodology.

## Assess to compare, or to improve?

"Everyone talks about peace, but no one educates for peace. People educate for competition, and this is the beginning of any war. When we educate to cooperate and be in solidarity with one another, that day we will be educating for peace." – Maria Montessori

Student assessment nowadays is very often focused on comparison! Who is the "best" student in class? Who received the medal and entered in the school's honour board? Which school is the highest in the ranking of the country? What about the others? What did they achieve? What is their worth and how were their needs met? Were they assessed just to be

told that they did worse than others and they are not good enough? According to which criteria was this comparison even made?

We naturally compare ourselves to others and competition is part of human nature. It helps us learn more about ourselves and test the limits of our potential. However, as Rolene Strauss once said, "We measure our weaknesses against other people's strengths, and this way, we always fall short". Comparison and competition can have a great impact in a person's selfesteem, which consequently influence the way they perceive their successes and failures and, as we have already explained, this influences their learning and development. Acknowledging that competition and comparison are always present in our development, schools should build an environment that brings healthy interactions that balance this natural phenomenon. This is, schools should reinforce that progress and achievement should always be masterybased (aiming to be better than before and not better than someone else) and foster a sense of community, solidarity and cooperation.

This doesn't mean that having a comparative overview of the whole class progress isn't useful for the teacher to reflect on the overall progress and the classes' characteristics or that it doesn't produce valuable information for research and development. It does and this data can always be collected. However, it doesn't have to be part of the feedback given to students or criteria for evaluation in any sense.

Student assessment should promote self-awareness and redirect students' goals into a mastery mindset, by keeping a constant outlook on **"where I was, where I am and where I want to be"** despite the progress of others<sup>25</sup>. And if we think about it, if every student is different, what are we comparing, anyway?

# Assessing students in the 21<sup>st</sup> Century

We have covered a lot of ideas about a lot of different things so far ... education needs to be positive, embrace diversity, be equitable and use multiple means of engaging students. But how does it all translate into an innovative, coherent and equitable student assessment?

In this chapter we explain how it all can come together to into a meaningful, coherent and effective student assessment.

First of all, we would like to say that even though humans very often resist to change and are able to come up with infinite reasons as to why something is not possible ... change is indeed possible and without it there is no progress or evolution. First of all, as Rob Houben (founder of the Agora school model) says, lets "forget what we know about teaching, start we really know about learning" (highly recommended with what watch: https://hundred.org/en/innovations/agora#8f272d62). We know that in order to learn and develop, students need to be engaged, their minds need to be activated, they need to make mistakes without fearing them and they need to want to know more. Assessment must be part of this process. Through assessment students gain a clear view of where they are, where they were and where they want to go. They gain self-awareness and develop their self-regulation while learning.

If students have in their disposal an assessment that empowers them, who knows who they can become? So, let's start talking about assessment in the 21<sup>st</sup> Century. There are many types of assessment, and each author describes them differently, however in ASSESS we will focus on two important forms of assessment: Formative and Summative. Summative assessment is a final assessment made with the purpose of determining whether the objectives of a learning module were achieved and to which level they were achieved. It marks the result of a learning journey. Formative Assessment is a constant exchange between

teachers and students. While summative assessment provides information about the results, formative assessment provides information about the progress, and at the same time benefiting the process. It happens fluidly during the learning journey, in the form of communication and feedback between teachers and students.

These two types of assessment are not different ways of collecting data and they don't even consider a different format of data. These types of assessment differ only in their purpose and in the way they deal with the same data<sup>26</sup>. In this document we will explain the difference and how they can be combined for an effective assessment.

### Summative assessment

When we talk about student assessment, the first thing that comes to mind to most of us is tests, exams, and grades... and maybe for some of us it still brings the memory of the nervousness it came with. Assessing students by the end of a school period and giving them final feedback in the form of a grade or final report is what is called a summative assessment.

Many studies and projects today focus on the value of formative assessment as opposed to summative assessment, claiming that there is no added value in summative assessment. If we consider the common practices in summative assessment, like asking students to answer some questions and giving them a grade and nothing else, maybe this is true. If companies worldwide look for workers that are skilled, experienced, and motivated what does a number say about a person? Which of the following statements would a hiring person prefer to hear:

### "Hello, I am Maria, and I am a 17" or "Hello, I am Maria, I learn fast, love to solve problems, am really good in leading teams and have participated in the development of 5 projects around design and innovation in school".

In a world that is thirsty for skills, talent, innovation and entrepreneurship, a summative assessment that communicates students' achievements in numbers, based on a content-focused exam or test, fails to bring an added value. However, an effective summative assessment, that drinks from valuable data about students' skills and progress, can be an added value in demonstrating the real important achievements.

While formative assessment promotes the collection of data in several moments of the learning journey, summative assessment gathers all this data into one final, consistent, and useful performance report. This report consists of data about the students' progress in relation to the learning goals and skills set from the beginning and describe the achievements, with possible recommendations for further improvement. The following images represent an example of graphics that can be used in a summative assessment report:



Summative assessment is useful in many ways. Not only the expectation of being rewarded with a positive evaluation by the end of the work can be an extra motivation for students' development, but it can provide valuable information about their achievements. It can also bring valuable information for teachers to reflect on how much their students are ready for the next learning experience on how they can improve the effectiveness of teaching for the next learning period.

However, summative assessment alone is not an effective form of evaluation. If used alone, summative assessment marks a final judgement of students' achievements and leaves no room for improvement, correction, readjustment, and it doesn't promote the development of skills. This is where formative assessment comes in.

# **Formative Assessment**

Formative assessment has been described in many ways. It is seen by some as a series of tools, by others as a process, but little consent exists on a definition<sup>26</sup>. In ASSESS we consider formative assessment as a combination of both tools and process. The project offers teachers a series of tools (namely rubrics and checklists) that allow for a regular gathering of evidence, but the focus is on the process. Our perspective of formative assessment as a process focuses on the continuous evaluation and reflection about the learning process.

Let's consider an example: When observing someone making a pottery mug, we notice that the process is not straight forward. First, they pull the clay up, then down, then sideways, then they make it shorter, than taller, than thinner, etc. There is a constant evaluation and reevaluation that leads to adjustments through the process until the creator is satisfied with the final product. Formative assessment is just that! Is the ability to constantly evaluate and reevaluate and be aware of the adjustments that are necessary, every day, to achieve the desired learning goals.



Formative Assessment Focuses on the process / Aids the process Constant evaluation and re-evaluation to achieve the desired result.



Summative Assessment Evaluation of the result – sum-up of all stages of the process. Legacy of what was done.

This process can be paralleled with students' learning journey. Formative assessment is a process that should happen as a constant and not only in a series of predetermined moments. If students are constantly aware of their progress, they can make the necessary adjustments to their effort, attitude, methods, goals, etc. and become the leaders of their own learning. However, students may not know how to effectively carry out this systematic reflection and therefore the teachers' role in student assessment is so important.

Everyday teachers interact with their students and the communication that they establish can affect their development (as we have explained before in this document). This communication, if carried out with awareness and focus on specific guidance can orient students to a positive growth perspective and give them hints about how they can improve. Student assessment is not all about reports and evidence, it is also about the relation they create with their teachers, with their learning process and ultimately, with themselves. As such, formative assessment is also about the relation that students establish with themselves and their inner communication about where they are, where they want to go and how to get there (and teachers as intermediaries of this process).

This way, formative assessment involves:

- Establishing the learning and development goals (this process can and should involve cocreation with students and must be fully transparent to students).
- Clear definition of the assessment criteria and tools to be used to collect evidence (students must have access to the checklists and rubrics so they know from the beginning how they will be assessed, enabling them to gain awareness about the process as well).
- Using the tools to collect evidence in a regular basis, enabling for proper regular feedback between teachers and students – enabling all to evaluate their development in relation to the established goals.
- Looking at the evidence collected and decide with the students how each student can further improve.
- Keep a constant communication and feedback, with a positive mindset (focusing on progress instead of failure) and promoting a growth mindset (helping students understand that they can always improve if they persist).

Formative assessment allows students to recognize their strengths and weaknesses and offers them multiple opportunities for reflection and improvement. At the same time, it offers teachers constant feedback on the impact of their teaching methods, allowing them to improve and adjust where needed in "real time". This process can be done with the use of several different tools, however in ASSESS we use primarily check-lists and rubrics, and we focus on the development of skills. The specific methodology and tools used in ASSESS will be described in the next section of this document.

### **Assessing Skills**

The traditional school system as we know it (a classroom full of students sitting quiet and listening to a teacher delivering curricula content) was developed during the industrial revolution and has been called the "factory model"<sup>1</sup>. It was a system designed to teach the necessary knowledge and skills adjusted to very specific lines of work (like factories) and students would leave school and be prepared to do those jobs. Back then it was very common for students to already know what job they would have when leaving school, or the options weren't that many, so school was able to prepare them through the traditional methods.

However, the world has changed and evolved and not only the whole curricula content can be found online but the diversity of jobs available is so big that it is a futile attempt to try to predict what jobs our students will uptake when they leave school. In fact, it has been predicted that 80% of the jobs that will be carried out by the students that are now entering school do not yet exist<sup>29</sup>. So how can we prepare them if we don't update our education system?

The amount of information that runs in the internet is so vast that students can learn whatever they want, but it also becomes challenging to know how to filter what is valid from what is conspiracy theories or fake news. As such, it has become very important to teach students how to navigate the world they are leaving in, how to face uncertainty and be prepared for multiple opportunities that they will find and how to effectively navigate the world of information that now exists.

It is still important that students learn the content knowledge and understand how the world works, where we have come from and all the other very relevant information that we learn in

school, but most importantly students must develop skills. It is more important for a student to learn how to learn, how to solve problems and how to overcome challenges autonomously than to memorize a whole manual which will probably be forgotten a few years later.

A student that leaves school knowing how to work in group, how to think creatively, how to learn fast in an autonomous way and how to be proactive and resilient, is a student that will succeed in life, regardless of the job they have. Therefore, in ASSESS we focus our assessment in the development of skills.

There are many skills that teachers can aim to promote in their classes and therefore include in their student assessment. These can fall in several different domains like social, emotional, cognitive, interpersonal, ethical, environmental, mathematical, digital scientific, and the list goes on. In ASSESS we selected a few skills that can be applied in any school project/activity and that we considered to be the most relevant ones. However, we highly recommend teachers to add/remove skills in order to turn the assessment as suitable to their needs as possible.

The skills used in ASSESS are listed here along with a short description. These skills and descriptions were retrieved and adapted from Sanchez, A. V., & Ruiz, M. P. (2008)<sup>28</sup>:

- **Critical Thinking:** "The habit of questioning things and analysing information before making a judgment. It concerns itself with the foundations on which ideas, actions and judgements are based."
- **Creativity:** "Searching to find and form new and valuable ideas/solutions that make sense in different areas of life."
- Interpersonal Communication: "Interacting positively with others through empathetic listening and through respectful, clear and assertive expression of what one thinks and/or feels, by verbal and non-verbal means."
- **Collaboration Teamwork:** "Actively joining and participating in the attainment of shared goals with other people, departments and/or organisations."
- **Problem Solving:** "Identifying, analysing, and defining the significant elements constituting a problem in order to solve it effectively and with good criteria."
- **Diversity and Interculturality:** "Understanding and accepting age, cognitive, sex/gender, social and cultural/religious (and all forms of) diversity as something that is personally and collectively enriching, coexisting with other people without incurring in discrimination."
- **Oral communication:** "Expressing clearly and opportunely one's ideas, knowledge and feelings in speech, adapting to the audience and situation to ensure good comprehension and attention."
- Writing skills: "Relating effectively to others through clear written expression of what one thinks and/or feels, using graphic support as necessary."
- **Learning Orientation:** "Being committed to personal growth and learning. Actively seeking to learn and engaging in learning activities and proposals, assuming learning goals as own."
- **Ethical Sense**: "Being positively inclined toward the moral good of oneself and of others (that is, toward everything that is good or tends toward the wholesomeness or realisation of the individual) and perseverance in that moral goodness."
- **Project Management:** Effectively planning, directing, evaluating, and monitoring a complex project, developing an idea until it is materialised in a service or product.

### Assessing students' knowledge

Student assessment is a multifaceted part of education and should be as ample and diverse as human nature itself. As such, it is not possible to write a document describing an effective and inclusive assessment strategy without mentioning the assessment of students' knowledge.

Although we believe that assessing students' skills is much more effective and important nowadays, it is still important to assess students' knowledge both prior and during the learning journey. Knowing what students already know and how well they are understanding the content they have contact with is very important to support them in discovering more and evolving in their knowledge.

# It is, therefore, very important to consider that tests and exams are not harmful or impeditive if they are just as one part a diversified student assessment strategy.

The most common way to assess students' knowledge is through tests. Given the high emphasis given to tests and exams in education, these can often trigger high levels of anxiety, which prevents students from performing as well as they could. If can also lead to students avoiding the effort or even feeling bored and disengaged. In its worse, this type of assessment may lead to students feeling that they are not capable of overcoming the challenge and to lose contact with their true abilities and talents.

To overcome this, teachers can consider new and creative ways to assess students' knowledge through challenging tasks and gamification. Using these strategies, teachers can assess their students' knowledge without them even realizing that they are being "tested", hence, without anxiety and low self-confidence getting in the way.

This can be achieved through several activities like mind mapping (knowledge maps), debates, strategic questions during the class, creative storytelling, thematic games etc.

There are also several digital and online platforms that allow teachers to infer students' knowledge in a fun and gamified way. Kahoot [https://kahoot.com], for example, allows teachers to quiz students about curricula content. Students can play individually or in teams and have a limited time to choose their answer. In the end, the platform announces the winners. Mentimeter [https://www.mentimeter.com/app] allows for an anonymous collection of ideas, opinions, and all types of feedback, which the platform can present in several visual ways (graphics, word clouds, tables, etc.). Plickers [https://get.plickers.com] allows teachers to quiz students through a digital platform, even if students don't have a digital device. Each student receives a paper with a QRcode that allows them to choose from 4 different multiple-choice answers, which the teacher scans with their smartphone. These apps, as many others, accommodate students' interest for the digital and introduce a gamification component that increases their motivation and engagement, increasing their chances of success.

Students can also be encouraged to create videos, podcasts, music, art, performances, or any other type of presentation to express the knowledge they have acquired. The more variety teachers offer to their students, the higher is the chance that they are accommodating their needs and talents.

### How to design an effective assessment

Now that we have covered all the main theoretical aspects behind the ASSESS project framework, we will specify which tools teachers can use and how to effectively adapt them to their personal context. It is important to keep in mind, however, that the most important part of any assessment method is the mindset that students and teachers have around it. Everything

begins with the relation that students have with their learning journey and the relations they establish with their colleagues and teachers.

We therefore leave here a warning that teachers should not put all their attention in adapting/designing/applying the assessment tools and forget about the human and holistic nature of a positive assessment. Empathy, diversity, and equity come first. The tools are just a very helpful addition to systematize this process.

More important than just using tools, it is important to keep a constant observation, communication, and feedback with students. Teachers should always stay tuned to the development of their students and should consider that everything they say to their students has an impact. Therefore, when giving feedback to students daily it is important to consider that this feedback should follow some important criteria. For this, teachers should always think about:

- Is what I am about to say positive?
- Am I being simple, clear, and concise with this feedback?
- Is this student receptive to this feedback? If not, how can I promote a change?
- What am I trying to achieve with this feedback? Is this feedback likely to achieve this goal?

There is no right answer or "ingredient list" for the designing of effective assessment tools or methods, as student assessment must be design taking into considerations many aspects such as the target population, the context on which the skills are being developed, which skills will be promoted, the socio and cultural background of students and teachers, the objectives of learning and teaching, etc. All of these will vary from one situation to the other. However, there are a few things that we can take into consideration when designing assessment tools and strategies, that will allow for their effectiveness. In the following pages we describe some useful tools to assess students and we describe a methodology called Design Thinking that will help you to integrate everything into a meaningful assessment strategy.

### **Rubrics for Assessment**

The most well-known, effective, tool for formative assessment is the rubric. A rubric consists of well-defined criteria (indicators) and performance levels (descriptors) related to a specific domain, for example, to a skill. It describes the different performance levels an individual can achieve in a determined domain, allowing for the placement of each student in each moment in a proficiency level. Several studies show evidence of the effectiveness of rubrics in assessment (for example: Brookhart, S. M. (2018)<sup>27</sup>.

Using rubrics teachers can plan their assessment beforehand and can share with students from the beginning what are their expectations in each assessment domain. Students can clearly understand the different levels of performance for each domain and can plan for their own development. Furthermore, it allows students to place themselves in the different levels through a constant self-evaluation, promoting the self-regulation of learning and skill development.

By using rubrics, the assessments suggested by the teacher are clear to the students since they will know what each level means. This way, **not only students understand how they are being assessed but they can also more effectively communicate and argue with the teachers about their assessment** using clear descriptors as a reference. In case a student doesn't agree with an assessment, they can create a constructive argument using the descriptors as a reference and showing evidence of their achievements. Likewise, teachers have the support of the descriptors to argue about their assessments. Furthermore, by having contact with the rubrics, which contain all the assessment criteria explained in an explicit way, **students already gain awareness about what skills they can develop**. This fact alone can act as a catalyst for self-awareness and development, even if not in a totally conscious way.

Rubrics are therefore a very effective tool to support the evaluation of students in different moments as well as an important aid in the communication between teachers and students.

CRITICAL THINKING						
INDICATORS	DESCRIPTORS					
INDICATORS	1	2	3	4	5	
Showing critical spirit	Does not seem to question information, situations, or conditions of own life.	Visibly questions certain information and situations in own life.	Shows a critical attitude towards information received and the conditions of own life.	Explores and inquires the world around. Shows to be reflective about acquired information and own life.	Demonstrates to formulate personal judgements and evaluations based on systematic reflection.	
Distinguishing facts from opinions, interpretations, evaluations, etc. in others' argumentation	Presents personal judgements or decisions based on opinions and personal interpretation as though they were objective facts.	Accepts without question judgments or decisions based on others' opinions and personal interpretation as though they were objective facts.	Questions judgments or decisions based on opinions and personal interpretation.	Proves to be able to distinguish objective facts from opinions and personal interpretations.	Demonstrates to recognize, question, and analyse judgements or decisions based on opinions and personal interpretation.	
Actively participating in discussion	Remains passive during discussions.	Struggles to participate in discussions.	Actively participates in discussions.	Participates constructively in discussions, contributing to rich shared reflections.	Participates constructively in discussions serving as a reference to others.	
Foreseeing the practical implications of decisions and approaches	Does not appear to be aware of the effects of decisions and proposals.	Appears to ignore the practical implications of decisions and proposals.	Proves to foresee the practical implications of decisions and proposals.	Analyses the pros and cons of the effects of decisions and proposals.	Adequately evaluates the pros and cons of decisions and proposals.	
Reflecting on the consequences and effects of one's decisions on others	Does not seem to care or think about the consequences of personal actions on others.	Listens to others' observations and criticism but does not seem to reflect on them.	Seems to listen and reflect about the consequences and effects of personal actions on others.	Critically listens to others' opinions and recognises and accepts personal mistakes.	Asks for, weights, and considers others' feedback on personal conduct in a critical and constructive way.	

They can also be an easy tool for students to perform self and peer assessments providing clear information which they have access to from the beginning of the school year (or assessment period). Families can also have access to these rubrics to know what the expectations are from the beginning and to follow the students' progress throughout the learning journey. The Rubrics created in ASSESS focus on the development of skills and were adapted from Sanchez, A. V., & Ruiz, M. P. (2008)<sup>28</sup>. The team selected the most relevant skills for ASSESS and adapted the rubrics to better address the goals of the proposed assessment, as well as to become accessible to the students. Each skill is divided into 5 indicators, describing different dimensions of the skill. Each of the indicators can be assessed in 5 different levels, according to the progress of the students. This structure is exemplified in the following image:

The document detailing all the rubrics used in ASSESS can be found here: <u>https://assess.nuclio.org/assessment-toolkit</u>

ASSESS delivers rubrics that are fully prepared to be implemented. However, we highly encourage teachers to edit and adapt them to their personal context and even to add more competences or indicators that might be relevant and are not included in our list. In this document (in the "*How to design an effective assessment*" chapter) we describe a method that helps teachers to effectively adapt / design an assessment that is relevant for their context, i.e., effective for the learning goals and for the specific diversity of their class.

### **Checklists for Assessment**

Checklists are an easy-to-use tool to systematically record observations, which can be used both by the teachers and by the students. They detail the learning criteria that should be focused on during a learning activity/period in terms of development of skills, attitudes, and other relevant goals.

By using these checklists, teachers can easily identify students' needs and provide personalized support on a specific area of need. They offer an organized way of keeping observations that support teachers' guidance and that can be used as evidence for the regular assessments using the rubrics.

Checklists can usually be used in a yes/no format or with checkmarks that inform if a certain criterion has been achieved or if it is still in need of attention and development. The way that teachers use them is up to them, as they are meant to be quick and simple to use in an everyday/weekly basis.

Furthermore, checklists can be used to observe not only students individually but also groups or the class as a whole. Consider the following example:

	Skill 1: Critical thinking						
1st	2nd	3rd					
ОК	ОК	OK	Shows critical attitude and formulates personal judgements and evaluations.				
	OK	OK	Distinguishes objective facts from opinions and evaluations				
OK	OK	OK	Participates constructively in discussions.				
			Analyses the implications of decisions and proposals.				
		OK	Considers others' feedback on personal conduct.				

This checklist can either be used to register what has been accomplished, or what still needs to be worked on (according to what the teacher/student prefers). It can be used in several moments (in the example 3 moments are defined but teachers can add as many as they want).

In a certain moment, a student might have developed one or two of the indicators included in the checklist, so the teacher might choose to register those as being OK and decide to work with the student in the other indicators. In a second moment, the student might have shown to develop another indicator, which will lead the teacher to mark this as OK, and so on.

Teachers can also make their own additions in the checklists using a code system designed by them. For example, they might highlight a skill that is more relevant than others in a specific activity or learning period. They might mark with a circle a skill that is particularly difficult for a student. They might leave small notes with additional observations, and they may also add or remove indicators, based on the needs of each student.

Checklists are a very optional part of the process, but they may facilitate the formative assessment and the regular communication between teachers and students through an organized system of observation and collection o evidence for the assessment.

In ASSESS we suggest the use of the checklists as a more regular form of collecting evidence to then support the use of the rubrics which take more time and concentration from the teachers.

The document containing the checklists used in ASSESS can be found here: <u>https://assess.nuclio.org/assessment-toolkit</u>

### The ASSESS student assessment method

ASSESS proposes a complete sequence of steps to effectively carry out formative and summative assessments using checklists, rubrics, and a global assessment tool. Furthermore, the project offers teachers a digital app where all these tools are integrated and are easy to use.

The first step of any assessment is to define the learning goals and what needs to be assessed. Based on this, teachers proceed to select which skills they will focus on during the assessment and carefully study the checklists and rubrics linked to those skills. During this process teacher can edit the texts and make any necessary adjustments to ensure that the assessment is adequate for their unique context and the diversity of their class.

A very good practice (given the opportunity) is to **involve students in the preparation process as well**, asking for their valuable opinions and contributions in relation the learning goals, the selection of skills that will be assessed and their adequacy to their context.

After considering the checklists and rubrics as final, teachers should always share them with the students, making sure that they know from the beginning what are their learning goals and how they will be assessed (which tools will be used, how they will be used and in which moments). After this, the assessment process can begin.

ASSESS suggests the following sequence for student assessment.

1<sup>st</sup> – Using the checklists to regularly collect evidence and take notes

2<sup>nd</sup> – Using the rubrics to assess the level of development of students in several moments during a learning activity/period. This should be done several times before a final assessment, as it will help students to gain awareness of their development and have multiple opportunities to improve.

3<sup>rd</sup> – Generating a summative assessment (by the end of an activity/learning period or whenever necessary). By using the digital app or the global assessment tool (which is an excel) the summative assessment is automatically generated, using the information from all the formative assessments made during the learning period/activity. Both the app and the global assessment tool are designed to automatically generate graphics of development and a complete student assessment report with information from all the formative assessment moments and a final grade.

Note: The summative assessment is not an additional assessment moment. It is an automatic treatment of the data collected during the formative assessments and the final grade is generated as an average of all the assessments. However, teachers can select which formative assessments to be considered when generating the summative assessment and they can always choose to change the final grade of the summative assessment to a more adequate one if they would like to consider other factors not included in these tools.



Before using the ASSESS tools, teachers will find the option of configuring the assessment at several levels. For example, they can create as many formative assessment moments as they want. They can also attribute different weights to different skills for the summative assessment (for example, critical thinking can weigh 50% on the final grade whereas creativity and communication weigh 25% each).

More information and access to the tools can be found here: <a href="https://assess.nuclio.org/assessment-toolkit">https://assess.nuclio.org/assessment-toolkit</a>

More information about the ASSESS app and the link to install it can be found here: <u>https://assess.nuclio.org/assessment-app</u>

### Assessment in different learning and teaching methods

In the past few years, school education has been rapidly evolving and diverse learning and teaching methodologies have been increasing. With this diversity, a common question that arises is the one about student assessment: How can I assess my students?

Our learning and teaching method should never be based on the assessment strategies defined prior to the establishing of our goals.

# This means that assessment should adapt to the teaching and learning goals and methods, and not the other way around.

How often do we listen teachers saying, "I do not have time to innovate in this or that way, because I have to prepare my students for the exams?". This is the concrete portrait of how education can be influenced and limited by predefined assessment methods. And this is what we should, in fact, avoid.

Teaching and learning methods should be diverse and adaptable to the diverse needs and goals of education in this century and the assessment methods should be designed to support them and promote the development of the desired skills and competencies in students.

With this in mind, it is important to highlight that an effective assessment can never be based on one sole strategy or tool, but a combination of a variety of moments, strategies and resources.

Considering <u>expository classes and lecture-based instruction</u>, assessment methods can include diagnostic tests, quizzes, games (which can be fun if teachers explore online gamified tools like kahoot or plickers, for example), challenges that promote effective strategies for content organization and knowledge retention (like learning how to properly study, how to organize content in lists, concept maps, etc.), real-life scenarios where the knowledge applies and students have to solve related problems, reviewing and assessing existing literature, etc. The teacher can also promote debates, role-playing, song writing, theatre and other more creative and artistic forms for students to memorize and express their learnings. It is also important to promote activities that challenge students in higher order thinking skills, like those that require students to transport what they have learned to different situations, enabling them to solve new problems, demonstrating critical thinking, creativity, reasoning, problem solving, etc.

When promoting a student-centered approach like inquiry-based learning, project-based learning or others alike, a variety of methods should also be employed. Students can be asked to fill in an "exit ticket" by the end of each day, reporting on their processes, including the questions they have had and what they have done to find the answers, the challenges they faced, what worked and what they must improve etc. These exit tickets will consist in evidence that teachers can use to evaluate the progress of each student. In class debates can also be promoted to assess the level of involvement and knowledge acquired by each student as well as several other communication skills. In this format of learning, teachers take the role of supporters and observers, finding several opportunities to observe students and collect evidence about their attitudes and behaviours through check-lists and note taking. Teachers can also observe the group dynamics and the cooperative learning skills that each student is developing. The teacher can make specific questions to each student to evaluate what they are learning and how they need to improve, etc.

In the case of blended and online learning, for example, teachers can use digital resources like quizzes, discussion boards, online collaborative documents, online labs and platforms that collect learning analytics, assignments that contemplate the creation of digital content, etc.

These are just a few examples of assessment solutions that can be integrated in different learning and teaching methods, and do not represent all the possibilities. In our Era, everyday a new tool, idea or resource appears, and the trick is to be updated, research and be open to the innovative solutions that appear every day. **More importantly, to be flexible and provide multiple means of assessment and expression of knowledge and development.** It is through this diversity that teachers will provide students with an inclusive and effective assessment journey that will offer them the guidance they need to develop and achieve their potential, without hindering their learning or compromising their self-security and self-esteem.

### Privileging dialogic and democratic assessment methods

Regardless of the tools and strategies that teachers use to collect evidence from the students (through questioning, observation, games, etc. as previously mentioned) it is important to always ensure that the evaluation is done in a dialogic and democratic way. This is, the assessment strategy should be co-created with the students, or whenever this is not possible, at least presented to students in a clear way, before the learning and teaching journey begins. It is important that students feel part of their assessment, instead of feeling that it was imposed to them.

Students should be part of their own assessment throughout the school year as cocreators of their assessment journey. By making this process transparent to students, and involving

them, teachers will be fostering a sense of commitment and responsibility in students from the beginning. Furthermore, by having contact with the assessment criteria and the possible levels of achievement from the beginning, students will start developing their growth mindset from the beginning of the year. This increases their openness to the development of the target skills and fosters a more effective development and learning throughout the year.

# The Design Thinking approach to design an effective assessment.

### What is Design Thinking?

Design Thinking is a method that has been used in the business sector for a long time as a driver for innovation and for solutions centered on the user [30]. It is an empathic, creative way of understanding and solving problems, based on a human approach. This means that instead of inventing random solutions for a problem and expecting them to solve it, the design thinking approach guides us in a deep understanding of a problem and of the needs of those involved, invites us to imagine possible solutions in a creative way and involves us in the process of designing the solutions and sharing them. For its nature, Design Thinking is a powerful tool for problem solving and for developing solutions and strategies that target the most relevant needs of their users. As such, it also presents a high potential as a technique to be used when designing our strategies and tools for assessing our students.

### How does it work in education?

If we do an online search, we will find many different definitions, perspectives and a variety of guidelines and cycles related to the Design Thinking method, however we use one specific approach, which has been used very effectively in education. Considering the Design Thinking a valuable approach to innovative problem solving, a movement called Design for Change [https://www.dfcworld.org] created a very simple method to apply it in education: the FIDS method – Feel, Imagine, Do and Share. This method has been now widely used in education and adopted by many projects. In recent years, we (and others) have used this method too but re-adapted it to the four phases: Feel, Imagine, Create and Share [31].



Figure 1. Design Thinking steps - design created in the context of GSO4Schools Erasmus + project.

Although this document focuses on student assessment, to introduce the design thinking methodology to the student assessment perspective it is important to explain that this approach can be used in many different perspectives. Whatever approach is taken, Design Thinking is a very powerful tool for education. It can be adopted by the school board to solve problems in the school and to ensure that the needs of all students, teachers and staff are being met. It can be used by the teachers when designing their classes and/or assessment strategies (as it will be further explained in this document) to ensure that they are engaging and adjusted to their students' needs and motivations. It can also be used by the students when developing projects to solve problems in their schools, communities, and others. For its

versatility it can be used in all these levels and bring very positive changes to the school. Whatever the perspective or the level in which it will be used, the approach is the same and it is as follows:

### Feel

The most important part of any project or problem solving is to dive into it and deeply understand all its little details and nuances. For this reason, a Design Thinking approach starts with empathy, curiosity, and an attempt to see the problem from all different aspects and perspectives. It requires us to put ourselves in the shoes of others and see the situation from their perspective. This can often be the longest and most hardworking phase of a Design Thinking approach as it leads us to a process of research, discovery and whenever possible, interaction with those who will benefit from our solutions in a collaborative and co-creative approach.

#### Imagine

People usually have many ideas, even though they don't always feel comfortable enough to share them. This phase of the Design Thinking approach asks us to remove all boundaries and all limitations and express all possible ideas, without any judgement. Many activities and games can be applied here where the working team engages in a brainstorming of ideas. After all ideas for the problem have been shared, the team then proceeds to organize them and select the ones they want to work on. This process can only be effective if 1: the feel phase was thoroughly concluded, and the team has in mind all relevant aspects of the problem/subject/question and 2: if the team is working in a positive, creative and non-judgemental, collaborative environment.

### Create

After having selected the idea(s) to work on, in the create phase it is time to start working on them and making them happen! This is the time when the creative hands-on, solution generating process happens. In this phase, the team can call for the support and collaboration of all those involved and of relevant stakeholders in the specific field of work.

### Share

And finally, it is time to share! However, as simple as it might seem, sharing effectively also requires planning, organizing and a lot of strategizing. It is important to consider who will be the end users and those who we want to target, consider what are the best means and channels to reach them and to effectively make a dissemination effort. This can be as simple as a board meeting or as complex as a complete social media campaign.

When working with students in project-based learning, this is one of the most relevant phases of the process. It is the moment where students see their work recognized and having an effect in their surroundings. It is also a very important moment of pride and merit for all the teachers and others involved in the process.

Teachers working with us in other projects that use the Design Thinking approach, at the student level, have expressed that:

"Using Design thinking was fundamental in the development of our project with the students. The methodology put students in the centre of their learning, allowing them to explore new possibilities about a subject, improving their knowledge construction. Design Thinking allowed students to develop empathy, autonomy, creativity and simplicity. It awoke their motivation and interest, encouraged reflection as well as critical and scientific thinking. Some students said that the classes became more interesting and fun!" "Design Thinking was very important for students to learn how to organize their thoughts, their decisions and the attitudes to develop".

"Design Thinking is a strategy that involves students actively and makes them feel important in their own learning".

### The Desing Thinking approach for Student Assessment

Although our experience with Design Thinking in education is vast and we have been introducing it in schools for many years, to our knowledge, the potential of Design Thinking for student assessment hasn't yet been explored. It is our understanding that it can be a powerful approach to help teachers to design effective and human-centered strategies to assess their students in a positive and development-supporting way. As such, we hereby propose a simple, yet meaningful way of following the 4 steps, Feel, Imagine, Create and Share to design assessment strategies and meet the needs of ever-changing students. So, how can we do it?

Considering the previous explanation of the four phases of Design Thinking, we propose here one possible approach on how to follow these phases to create a meaningful student assessment.

### Feel (in the perspective of student assessment):

When it comes to student assessment, the most important thing to consider is, of course ... the students! **WHO** are they? Where do they come from? Do they have any relevant needs that should be considered in their assessment? What are their likes and dislikes? What do they already know about the subject at hand and what competences have they already developed? What is their comfort zone about the subjects to be addressed, what is their starting point and how far should we invite them to go?

While knowing all this from the beginning might be challenging when teachers deal with hundreds of students at the same time, there are a few ways to retrieve at least some of this information:

- Looking at the students in an empathic way, from day one, trying to see their behaviours, their expressions, their way of speaking, etc.
- Making a diagnostic assessment: which can be in the form of a test, a game, a quiz, a debate, etc., to know their level of knowledge from the beginning and define the starting point from there.
- Creating a form asking them about their personal interest, likes and dislikes, challenges and talents, etc.
- **Involving students** in the process of decision making about the learning goals and assessment strategy and even in the creation of the assessment tools, like rubrics, for example.

The second important thing to consider is **WHY** the students are being assessed. What is the purpose of this assessment and what does it mean to achieve? This question is key in the process because it will set the basis for the whole strategy to be defined. This is also the moment to reflect about the true intentions of the assessment. Whether students are being assessed just because they must (as a rule of the school, for example), or because there is an authentic purpose for it. For example, promoting the development of students and aiding them in their learning and self-regulation, while supporting their well-being. It is fundamental to ensure that whatever the intentions are, teachers stay true to them, and make them clear to the students.

After reflecting on the intentions of assessment, the third thing to consider is the learning goals and the expectations that will be set for the students. So, after knowing more about who the students are and where they stand in the beginning of the learning journey, the definition of the expectations for learning and development can becomes easier and clearer. Considering these, it is possible to define **WHAT** should be assessed. The focus may be to assess students' knowledge, their skills, their motivation, their emotional well-being. It is up to the teachers. However, it is important to be aware that WHAT will be assessed will set the basis for what the students' (and teachers') focus will be on during their learning journey.

### Imagine (in the perspective of student assessment):

Having the previous questions answered, it is time to consider the **HOW** and the **WHEN** to assess students. This part is strategic as it will be focused on deciding what tools to use and when to apply them. There is a huge variety of tools for collecting the evidence needed to assess students. We can use observation, quizzes, tests, games, role playing, debates etc. There are many already made tools online and teachers can create their own tools as well (in the create phase). The options are limited only to the creator's imagination and creativity.

After deciding how to collect evidence, one must decide how to evaluate the students, based on the collected evidence. The Rubric is the tool privileged in ASSESS for its potential in student assessment. Here again, there are many already created rubrics online, including the ones created by the ASSESS team. However, it is also possible to create new tools tailored to the context and ask students to participate in this creation (in the Create phase).

The imagine phase is perfect to brainstorm with students and with colleagues. Maybe working together, enables the creation of a common strategy across subject domains and the use of the same or complementary tools. Maybe students can find tools that they will love using, like online games, quizzes, etc. This is the moment where all ideas count. By the end of this phase, those involved will select the ones to be implemented.

After choosing which tools will be applied, it is time to decide on the regularity of implementation of each tool. How often should each tool be implemented to collect information about what students have learned? How often should observations be made in class? How often should debates be promoted to understand and evaluate competences and knowledge? How often should notes about the students' development be taken? etc. It is recommended, however, that students receive feedback regularly, as a result of the assessment strategy, so, even if some tools are only implemented once a month, or once every 3 months, observation, questions and communication should be a constant form of collecting evidence and sharing.

These are the most important questions to consider before starting to actually create and define the assessment strategy that will be implement with the students:

# WHO – WHY – WHAT – HOW – WHEN

It is important to note, however, that as with many things in life, there isn't only one correct or effective strategy. There are many! However, by following these steps and considering these questions, we can start guarantee a more meaningful and effective student assessment.

### Create (in the perspective of student assessment):

This is the moment to put hands into action, considering all the questions that have already been reflected upon and answered. Using all the information collected so far, this will be the time to put everything together. It is important to create an assessment plan with a timeline and with the tools that will be implemented in each moment. When using tools found in online repositories, it might be necessary to adapt them to make them more directed to the specific goals and students' needs. If no adequate tools exist online, it is possible to create new ones. Teachers and students together can create new rubrics, for example. So, it is important that, if possible, students are involved in the process as well.

Colleagues from different subject domains can also collaborate and create a complementary assessment approach for their classes. Teachers can share their tools among each and ask their colleagues to review and add whatever they find important. Collaborating promotes a better holistic approach to assessment in school.

It is very important, however, to consider that all the tools selected and created are designed in a way that all students can understand! It is common to find rubrics and other assessment tools designed in a language that only teachers and other professionals will understand, and this is of little use for students. So, choosing a simple language approach that is accessible and relatable for the students in a key part of this process.

### Share (in the perspective of student assessment):

Finally, having all tools created and a timeline defined for the student assessment, it is time to share! The whole assessment plan, tools, expectations, and goals should be shared with student from the beginning. This will allow them to fully understand how they will be assessed, when, why, and in relation to what. This should be done right in the beginning of school, so that the students can fully understand what will be expected of them and take ownership of the process.

Sharing the assessment strategy with the parents is also something to consider, in the hopes that they will be a supporting part of the process. However, this is optional.

Sharing should be a constant approach in classes. Assessment should be open, simple and understandable to all.

### Transparency and co-creation with students

It is very important to involve students in the process, whenever possible, as it will make them own their assessment journey and feel part of the decisions that determine their life-course. They can be involved in all the questions of the Feel and Imagine phases as well as in the creation part, and ask for their contribution, which may, sometimes, be surprisingly helpful.

Students should also be part of their own assessment throughout the school year. By having a transparent process and being actively involved in it, students will develop a sense of commitment and responsibility from the beginning. Furthermore, by having contact with the assessment criteria and the possible levels of achievement from the beginning, students will start developing their growth mindset from the beginning of the year. This increases their openness to the development of the target skills and fosters a more effective development and learning throughout the year.

# What do teachers think?

By the beginning of the ASSESS project, we created a needs-analysis questionnaire to distribute among teachers, to understand what their real needs and awareness regarding innovation in student assessment were. We did not want to design a whole assessment framework without knowing what teachers thought and needed.

We collected information from over 200 teachers from Portugal, Greece, Spain, Romania, Italy, Croatia, Colombia, Germany, Macedonia, Philippines, Nepal, Belgium, and Bulgaria. Reading their answers it became clear that there was a need and willingness for innovation in student assessment, both in terms of the mindset and in training related to new methods and tools. It was also noticeable that even though most teachers claimed to perform formative student assessment, when asked about how they did it, it showed that it was mostly content focused and that teachers weren't actually doing formative assessment but intermediate summative assessments (using a test in the middle of the semester or one small test before the bigger test).

It was also surprising to see that most teachers were open to innovating and experimenting new things in terms of student assessment, as part of an evolving educational system. As such, it was reinforced that ASSESS came in the right time and that innovation in student assessment should be a continued effort if we want to truly improve education.

More information about the results can be found in the ASSESS project website: <u>https://assess.nuclio.org/an-innovative-assessment-framework</u>

# Conclusion

We are living in an everchanging world. Society isn't what it was even 20 years ago. Ways of living, ways of thinking, ways of connecting are all different and in motion. Education is living a big revolution as it was encouraged to do a sudden and big leap to accommodate all of these changes all at once. The process is still ongoing and there is still a long pathway ahead. Looking at old ways of teaching, learning and assessing students may give us the ground for success but it is by looking ahead that we will ensure that the new generations find a relevant education. It is through this education that society will thrive and a sustainable way of living will be found.

Humans and nature are diverse and include in themselves an immense richness. Education and assessment should be made for this diversity and never hinder it. Students should see their assessment as a tool that enhances their learning and development and not as something that is scary, promoting competition or used to judge them. Learning is a process in motion and so should be assessment.

Student assessment is a fundamental pillar in education, which has the power to set the tone and the direction of learning.

Considering this, this document proposes a new mindset, which aims to promote a positive student assessment that supports development and well-being and that invites students to improve themselves as a constant way of being. It aims to bring awareness for the immense richness of human diversity and how schools should embrace it and never hinder it.

It is our hope that this work will support teachers in finding their ways for an inclusive assessment, which empowers their students to the highest of their potential.

# References

- [1] Moving Our Education System Forward (2020). *Factory Model of Education*. Available online at: <u>http://creativecurriculumisabella.weebly.com/the-factory-model-of-education.html</u> (accessed September 20, 2021)
- [2] European Commission (2017) 'White Paper on the future of Europe': https://europa.eu/european-union/ sites/europaeu/files/whitepaper\_en.pdf
- [3] Howells, K. (2018). The future of education and skills: education 2030: the future we want, OECD:

https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf

- [4] Brookhart, S. M. (2018, April). Appropriate criteria: key to effective rubrics. In Frontiers in Education (Vol. 3, p. 22). Frontiers.
- [5] Granberg, C., Palm, T., & Palmberg, B. (2021). A case study of a formative assessment practice and the effects on students' self-regulated learning. Studies in Educational Evaluation, 68, 100955.
- [6] Weiner, B. (1972). Attribution theory, achievement motivation, and the educational process. Review of educational research, 42(2), 203-215.
- [7] Zhou, J., & Urhahne, D. (2013). Teacher judgment, student motivation, and the mediating effect of attributions. European journal of psychology of education, 28(2), 275-295.
- [8] Friedrich, A., Flunger, B., Nagengast, B., Jonkmann, K., & Trautwein, U. (2015). Pygmalion effects in the classroom: Teacher expectancy effects on students' math achievement. Contemporary Educational Psychology, 41, 1-12.
- [9] Mesler, R. M., Corbin, C. M., & Martin, B. H. (2021). Teacher mindset is associated with development of students' growth mindset. *Journal of applied developmental psychology*, *76*, 101299.
- [10] 10- Larson, R. W., & Rusk, N. (2011). Intrinsic motivation and positive development. *Advances in child development and behavior*, *41*, 89-130.
- [11] Miller, M. B., Van Horn, J. D., Wolford, G. L., Handy, T. C., Valsangkar-Smyth, M., Inati, S., ... & Gazzaniga, M. S. (2002). Extensive individual differences in brain activations associated with episodic retrieval are reliable over time. Journal of Cognitive Neuroscience, 14(8), 1200-1214.
- [12] Cerna, L., et al. (2021), "Promoting inclusive education for diverse societies: A conceptual framework", OECD Education Working Papers, No. 260, OECD Publishing, Paris.
- [13] Taylor, V. J., & Walton, G. M. (2011). Stereotype threat undermines academic learning. Personality and social psychology bulletin, 37(8), 1055-1067.
- [14] Absoud, M., Wake, H., Ziriat, M., & Hassiotis, A. (2019). Managing challenging behaviour in children with possible learning disability. BMJ, 365.
- [15] Inclusive Assessment Equity, Diversity and Inclusion (2022, march 9<sup>th</sup>). Oxford Brooks University. <u>https://www.brookes.ac.uk/staff/human-resources/equality-diversity-</u> and-inclusion/guides-to-support-inclusive-teaching-and-learning/inclusive-assessment/
- [16] Thibodeau, T. (2021), The science and research behind the UDL framework. Novak Education. <u>https://www.novakeducation.com/blog/the-science-and-research-behind-the-udl-framework</u>
- [17] García-Campos, M. D., Canabal, C., & Alba-Pastor, C. (2020). Executive functions in universal design for learning: Moving towards inclusive education. International Journal of Inclusive Education, 24(6), 660-674.
- [18] OECD (2021), Education at a Glance 2021: OECD Indicators, OECD Publishing, Paris, https://doi.org/10.1787/b35a14e5-en.
- [19] Halabisky, D. (2018). Policy brief on women's entrepreneurship.

- [20] Mesman, J., & Groeneveld, M. G. (2018). Gendered parenting in early childhood: Subtle but unmistakable if you know where to look. Child Development Perspectives, 12(1), 22-27.
- [21] Marcy, V. (2001). Adult learning styles: How the VARK learning style inventory can be used to improve student learning. Perspectives on Physician Assistant Education, 12(2), 117-120.
- [22] Fleming, N., & Baume, D. (2006). Learning Styles Again: VARKing up the right tree!. Educational developments, 7(4), 4.
- [23] Shearer, C. B., & Karanian, J. M. (2017). The neuroscience of intelligence: Empirical support for the theory of multiple intelligences?. Trends in neuroscience and education, 6, 211-223.
- [24] Gardner, H. (1983). The theory of multiple intelligences. London: Heinemann.
- [25] Van Yperen, N. W., & Leander, N. P. (2014). The overpowering effect of social comparison information: On the misalignment between mastery-based goals and selfevaluation criteria. Personality and Social Psychology Bulletin, 40(5), 676-688
- [26] Dolin, J., Black, P., Harlen, W., & Tiberghien, A. (2018). Exploring relations between formative and summative assessment. In Transforming assessment (pp. 53-80). Springer, Cham.
- [27] Brookhart, S. M. (2018, April). Appropriate criteria: key to effective rubrics. In *Frontiers in Education* (Vol. 3, p. 22). Frontiers Media SA.
- [28] Sanchez, A. V., & Ruiz, M. P. (2008). Competence-based learning. *A proposal for the assessment of generic competences. Bilbao: University of Deusto*. Available online: <u>http://www.deusto-publicaciones.es/ud/openaccess/tuning/pdfs\_tuning/tuning13.pdf</u>
- [29] European Commission (2017) 'White Paper on the future of Europe': <u>https://europa.eu/european-union/sites/europaeu/files/whitepaper\_en.pdf</u>,
- [30] Owen, C. L. (2006). Design thinking: Driving innovation. *The Business Process Management Institute*, 1-5.
- [31] Doran, P., Tsourlidaki, E., Mentxaka, I., Vicente, T., Gomes, M., & Doran, R. (Eds.). (2021). Design Thinking in STEAM Education. Elinogermaniki Agogi.