HOW PERSONALIZED LEARNING PLATFORMS COULD IMPROVE SOCIAL-EMOTIONAL SKILLS

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Abstract

Recent advances in technology have enabled the scaling of personalized learning. Supported by philanthropic funding of the tech industry, the digitalization of personalized learning is gaining momentum. Educational institutions are adopting the new promising technology as a means to promote academic achievement by tailoring the instruction to the individual needs of the students. These are supposed to be met by providing the students with a curriculum that adjusts to their zone of proximal development (ZPD) along with ensuring that they can progress through it at their own pace. The learning platforms are also said to contribute to the improvement of social-emotional skills.

Meanwhile, despite the current focus on personalization of the learning experience of students in K-12 education, there is no agreed-upon definition of what constitutes personalized learning (PL). The broadness of the definition of personalized learning gives rise to a certain degree of ambiguity in defining what features are to be found in the personalized learning platform.

Similarly, there is a need for an external independent evaluation of whether the use of such tools does improve academic achievement and social-emotional skills as the developers of these tools claim. To date, little research has been done on the effectiveness of personalized learning platforms on the academic outcomes of students, and even to a lesser extent, its influence on social-emotional skills has been evaluated.

The purpose of this paper is to examine the features of personalized learning platforms that add to the development of students' social-emotional skills as they are defined in key social-emotional skill frameworks. By capturing these characteristics we intend to stimulate further research on the assessment of the effectiveness of digital tools for personalized learning on the improvement of social-emotional skills.

Keywords: personalized learning, social-emotional skills, SES, digital tools.

1 INTRODUCTION

Social and emotional skills (SES), such as self-control, persistence, and emotional regulation, are said to be significant predictors of academic achievement [1], [2]. These domains of the Big Five model which SES framework is built upon [3] are strongly related to students' grades. A study of undergraduate students [2] demonstrated that conscientiousness, or task-performance, was not only a consistent predictor of grades, but even after controlling for gender and students' IQ, also was more powerful in predicting them than SAT scores.

Apart from mere academic benefits, social-emotional skills are regarded as a tool to promote equity in education [4]. Educational equity means that every student "has access to the educational resources and rigor they need at the right moment in their education across race, gender, ethnicity, language, disability, sexual orientation, family background and/ or family income" [5]. Social-emotional skills are viewed as instrumental in increasing students' cognitive skills [6]. They have the potential to bridge the gap in academic performance which stems from the fact that some children are raised in the nurturing environments of their families and the impoverished are not [4], [7].

Finally, the ever-changing fabric of society requires children to develop complex skills, or compound skills as they are referred to in the SES framework [8]. For example, a lack of preset career paths calls for adaptability and strong metacognitive skills are a precursor for developing self-regulated learning skills [9] as a key element in the process of life-long learning. Furthermore, students need to be adept at critical thinking in order to be able to navigate through the overwhelming information flow.

In our study we will be utilizing the SES framework, developed by OECD [8]. The framework was designed as a part of the international study on social and emotional skills of primary and secondary school. It is organized around the Big Five personality traits and focuses on the cognitive and social-

emotional skills, addressing the skills deemed necessary in the 21st century as well. At the core of the model are the broad dimensions that describe different behaviors, values and thoughts: task-performance, emotional regulation, collaboration, open-mindedness and engagement with others [10]. The framework is also appended by so-called compound skills, denoting that these skills represent a combination of two or more individual skills [11].

The broad dimensions are split into narrower, low-order skills. Task-performance refers to self-discipline, being responsible to others, having an inclination to be hard-working and persistent in achieving goals. Task-performance, or conscientiousness, includes self-control, responsibility and persistence. Emotional regulation, or emotional stability, refers to a set of skills that enable students to manage negative emotions and deal with negative experiences. Emotional regulation encompasses three components as follows: stress-resistance, emotional control and optimism. The third dimension, collaboration, or agreeableness, translates into abilities to show sympathy towards others, engaging in prosocial behaviors and building healthy relationships with others. Empathy, trust and cooperation are the sub-domains included in the model. The fourth dimension which is open-mindedness, or openness to experience, is regarded as a skill that equips students to accept the change and deal with it especially in the circumstances that are characterized by high unpredictability and uncertainty. This dimension is split up into curiosity, creativity and tolerance. Finally, engaging with others, or extraversion, points to an ability to build social networks, and being energetic and assertive. Among its sub-domains the researchers identify sociability, assertiveness and energy. Similarly, the dimension of compound skills incorporates self-efficacy, and achievement motivation [8].

It has been well-documented that social-emotional skills along the lines of cognitive skills are malleable, and can be enhanced through interventions be they formal or informal [12], [13].

Family environment and teaching practices are known to have a substantial impact on social and emotional development of children [14], [15]. Parents and caregivers can support the social and emotional development of their children by instilling values, creating sustainable habits and routines, becoming role models to emulate [14]. Teachers in turn can influence the student's social and emotional skills in a direct and indirect way. For instance, they could shape students' mindset by encouraging them to embrace the tasks which present a certain difficulty and giving honest feedback on their accomplishments [16]. Similarly, it is the teachers who build a learning environment, which could be conducive to collaboration thereby demanding students to develop their communicative competencies.

Interestingly, research has shown that teachers' abilities to foster the development of cognitive skills do not strictly correlate with their abilities to aid the development of social-emotional skills [17]. This finding prods us to assume that there are certain practices that suit the purpose of developing social and emotional skills better, which are yet to be identified, though. Moreover, as the educational landscape has seen dramatic changes with the pervasive penetration of technology in the classroom, the question arises whether these innovative digital educational tools could imitate these practices or even magnify them in order to bolster social and emotional skills?

In the following section we will look at how some of the skills which constitute the OECD framework could be developed through personalized learning enhanced by digital tools and within personalized learning platforms in particular.

2   DEFINING PERSONALIZED LEARNING

Personalised learning (PL) has become an increasing trend in the education sector. Furthermore, the "education policy discourse of a number of countries" has given rise to the recent emergence of scientific work on personalisation [18]. Despite the growing interest in PL, there is no agreed definition of "personalisation", which leads to a range of ways to put the concept into practice [19] and also to different meanings to different stakeholders [20]. In this vein, this paper presents the views on personalised learning of the prominent organisations in education, such as Organisation for Economic Co-operation and Development (OECD), Bill & Melinda Gates Foundation (RAND) and International Association for K-12 Online Learning (iNACOL).

First to mention is the viewpoint of the OECD on personalised learning. The organisation regards PL as "holistic, person-centred approach to learner development," which shifts from "one-size-fits-all" educational process to "individuals' needs and to the knowledge society at large" [21].

Furthermore, the RAND Corporation describes the concept in question as [22]:

Personalized learning prioritizes a clear understanding of the needs and goals of each individual student and the tailoring of instruction to address those needs and goals. These needs and goals, and progress toward meeting them, are highly visible and easily accessible to teachers as well as students and their families, are frequently discussed among these parties, and are updated accordingly.

Besides, the RAND also outlines that PL refers to a "collection of instructional practices and school conditions that enable the creation of individual learning experiences and pathways for students" [23]. Therefore, the corporation emphasises that a student should be put into the core of learning.

iNACOL looks at personalised learning through the perspective of [24]:

...tailoring learning for each student's strengths, needs and interests-including enabling student voice and choice in what, how, when and where they learn - to provide flexibility and supports to ensure mastery of the highest standards possible.

The provided definitions and descriptions outline the common features of personalisation. First of all, personalised learning is a student-centred approach. In other words, a student is not any more the object of teaching but the subject of the education process. Secondly, it is the tailored learning experience that encompasses the needs and goals of each student. Therefore, it is necessary to keep track of learner's interests, strengths and weaknesses in order to inform learning. Personalisation differs from other approaches in a way that it gives students a voice and choice in their learning path. Consequently, in the process of learning a student has a choice in, for example, the forms of assessment (project-based learning, problem-based learning, presentations, traditional quizzes etc.) to demonstrate the mastery of the content; the way to absorb the material (video, paper version, e-version etc.), the interaction patterns to work on the pursued goal. Finally, PL takes into account the environmental (school) conditions in order to ensure the flexibility of learning and those needs and goal achievement. The aspect in question is related not only to the atmosphere, in which students are, but also to the favourable environment that involves developed horizontal linkers between teachers, opportunities for continuous professional development inside and outside the organisation [25].

On the basis of the provided definitions it might be outlined that the concept of personalised learning involves a lot of aspects and elements that should be taken into account. In this vein, the study investigates the existing models of PL to find how the core components can be connected in the learning process. What is more, the definitions do not explicitly outline how social-emotional skills are promoted in personalized learning, that is, which mechanisms, tools, and strategies should be applied to develop social-emotional (soft) skills. Consequently, the viewpoints on SES in light of personalized learning is the second sound reason to look into the models.

3   MODELS OF PERSONALIZED LEARNING

To start with, the OECD presents one of the models of personalised learning [26]. In essence, different interpretations of these elements of PL can be found in educational strategies internationally and specifically in the educational policies of OECD countries [18]. Milliband in the document of the OECD discusses five components that underpin personalised learning [26]:

- A personalised [learning] offer in education depends on really knowing the strengths and weaknesses of individual students;

- It demands that we develop the competence and confidence of each learner through teaching and learning strategies that build on individual needs;

- Curriculum choice engages and respects students;

- It demands a radical approach to school organisation;

- It means the community, local institutions and social services supporting schools to drive forward progress in the classroom.

More precisely, the OECD model takes account of assessment for learning, in other words, a student experiences "formative assessments through teacher, self- and peer assessments throughout a learning unit" [27]. In accordance with student's needs, strengths and weaknesses, the learning and teaching process is built, "developing the competence and confidence of each learner" [26].

Regarding the RAND, it suggests "four independent strategies," which are based on the findings from several research on personalised learning conducted at K-12 level [22]. These strategies include:

- Learner profile. From the perspective of RAND, it should be a database of each student's strengths, needs, motivations, progress, and goals established from all available sources. Consequently, this record will help to support the learning process, informing the steps towards the set goal.

- Personal learning paths. With the aid of a learner profile record teacher builds the learning trajectory, informed by student's choice and voice.

- Flexible learning environment. Learning environment takes into account staff, space and time to support implementation of PL. Importantly, the technology available to all students is viewed as an essential component to build a flexible learning environment. Consequently, the context of PL integration should support the educational process so that a student has a lot of opportunities to master the content, for example, one-to-one tutorials with a tutor, the pace that addresses a learner individual characteristics, flexible time limits when to take the tasks as well as the unlocked potentials of a digit to underpin the teaching-learning process.

- Competency-based progression. The element includes the progression towards the set goals that stem from the learner profile (student's strengths, needs and motivations) and continually assessed. Importantly, the assessment involves a variety of formats, such as project-based learning, presentations or more traditional ways, that is, tests. What is more, it takes place when a learner is ready to demonstrate an adequate level of competency. From the perspective of RAND model, competency (or competency-based learning) is considered to be a system, in which (a) a learner receive credit not as a function of how much time they spend studying a subject, but based on demonstrations and assessments of their learning; (b) learning experience is tailored to students' current level of knowledge and skills, allowing to progress at their own pace [28].

Likewise the definitions of PL, the outlined models (strategies) have the similar components: learner profile records to inform further practice; student's choice in curriculum and teaching-learning activities; formative assessment to demonstrate competency; environment in which a student may find plenty of opportunities enhanced by technology decisions to build the educational experience. Regarding the digital component in PL, Milliband in the OECD document argues that PL needs technologies in order to extend learning opportunities [26]. The same viewpoint is expressed by other scholars, for example, Abbott et.al say "technology is necessary to bring personalized learning to scale" [29]. However, it is not clear how the necessary skills should be promoted, so the discussed models do not fully describe what place social-emotional skills take in the personalised learning process.

The ecosystem where personalisation and SES present the key aspects of the learning process is built by Summit Learning. Summit Learning is a research–based approach to education that is designed to drive student involvement, meaningful learning and strong student-teacher relationships that prepare students for life beyond the classroom [30]. The organisation provides schools joined to the project with the educational program and Summit Learning Platform. The educational program adapts personalised approach to teaching and learning, and their platform is viewed as a supporting tool, where students are able to work through projects, submit schoolwork, take tests, and access a variety of materials for their lessons. In this vein, the Summit pays particular attention to the technological component of personalized learning outlined in the aforementioned models.

The organisation underlines that their focus is on four key student outcomes: "Cognitive Skills," "Content Knowledge," "Habits of Success" and "Concrete Next Step" [31]. Relevant to the social-emotional skills, is the component called Habits of Success.

The term "habits of success" is used to describe dispositions, mindsets and behaviours that a learner needs to be ready for life after school. In particular, the Summit adopts the Building Blocks for Learning Framework proposed by Brooke Stafford-Brizard on behalf of Turnaround for Children [32]. Habits of Success involves promoting skills in five categories: healthy development, school readiness, mindsets for self and school, perseverance, independence and sustainability. Besies, each category has sub-components which build the Summit Learning framework for comprehensive learning development, including 16 sub-elements. The examples might be stress management and self-regulation in health development category; self-awareness in school readiness; sense of belonging and self-efficacy in mendsets for self and school category; resilience in perseverance part; self-direction, curious and civil identity as the elements of the highest block of the framework, "independence and sustainability." The Summit Learning [31] points out that 16 skills were selected based on three criteria: alignment to the development of the child as a learner, measurability of skills, behaviours or mindsets that a student may develop over time, research base behind that proves the importance of these skills for college and career success.

Finally, this Summit framework recognises that children have different backgrounds and do not follow the same pathways. In addition, the Summit argues that social-emotional learning should not be perceived as a separate learning program; in other words, it should be considered as "design elements permeate a school model" [31].

In this connection, it is necessary to look into skills development in detail. We will outline a number of skills from the SES framework that could potentially be fostered through the use of digital educational tools and personalized platforms in particular.

4 FOSTERING SOCIAL AND EMOTIONAL SKILLS THROUGH PERSONALISED LEARNING

Perseverance and grit. Overlapping with the task performance dimension of the SES framework, which stresses the importance of self-control and persistence, is the concept of grit. Grit is defined as perseverance and passion for long term goals [33]. Studies have shown that students' perceived ability to get the result while exercising effort acts as a predictor of their perseverance in studies [34]. When conceived not as a fixed trait but as a skill that can be altered through the course of life, perseverance can be fostered. One of the ways of doing so is through interventions set to change student's beliefs about malleability of intelligence and the role of effort, that is about mindset [34]. Growth mindset intervention, which is presented in a form of behavioral training on the malleability of intelligence, could shift students' beliefs and consequently trigger higher levels of perseverance [35]. Interestingly, students' inherent level of perseverance can vary depending on the learning environment. For instance, when provided with an opportunity to observe the effort peers put in a given task, students tend to increase their own perseverance [36]. Thus, the feature that allows for peer effort observation coupled with initial growth mindset training embedded in a PL platform could enhance students' social-emotional skills which belong to the task-performance domain.

Emotional regulation. Emotional regulation, or an ability to deal with negative emotional experiences, is an essential skill for autonomous learners. Though not being fully autonomous, blended learning with digital personalized platforms implies a higher degree of independent work for students compared with analog frontal teaching approach. The aim of these digital tools in turn is to mould a self-directed learner who can successfully guide her learning process.

One of the major obstacles which students face while working independently is confusion that might not be timely resolved without a teacher intervention [37]. If the confusion persists, students might experience stress, and become disengaged [38]. This effect could potentially be mitigated by emotional regulation strategies. These split into two broad categories: antecedent-focused and response-focused strategies. The former refer to things we do before a particular emotion unfolds, which means that the emotional sequence could be modified. The latter point to the things we do once an emotion is in full swing, requiring cognitive resources that could be otherwise channelled in a more productive way [39]. Of the two, antecedent-focused strategies are regarded as healthier emotional regulation strategies. For them to be deployed students need to be made aware of the impending negative emotions by early detection of their puzzlement.

Trace methods including log files, eye tracking, gaze fixation, physiological sensors, and facial expression data are said to be powerful tools in detecting learners' emotions and thus enabling them to regulate their state while the emotions haven't unfolded yet [40]. These methods could conceivably be deployed to foster emotional regulation of learners, although there is a serious concern for privacy of logged data.

Self-efficacy. Self-efficacy describes the degree to which individuals believe in their abilities and their effort needed to undertake complex tasks and achieve goals [41]. This concept is rooted in the idea that individuals make decisions and proceed with tasks not solely relying on their capabilities, but on their perception of their capabilities. These beliefs emerge in the course of life of a person, and as well as the other constituting parts of the framework, are subject to change.

The factors that shape self-efficacy are as follows: students' own experience, or mastery experience, by observing the experience of others, or vicarious experience, social persuasion, and physiological indices. Mastery experience is said to have the most profound influence on students' self-efficacy. Students learn, accomplish tasks, work on projects and by doing so interpret their capabilities to succeed in dealing with tasks in the future. The more challenging tasks the students are presented with, the more sustainable beliefs they shape if they have an opportunity to deal with them successfully. When personal experience is lacking, students are able to resort to vicarious experience, that is observing their peers

engaging with the tasks. If the role model possesses similar characteristics as the students do, their experience becomes relevant, and students' sensitivity to this experience heightens. The last outer factor that provides students with information on their chance of success is social persuasion which is basically verbal or non-verbal feedback students receive. In order to be effective, feedback should be framed to support students' self-efficacy [42]. The most benign is formative feedback which identifies the zone of proximal development for a student and guides them how to get there.

Personalized learning platform presents an environment which could be conducive to forming positive beliefs about students' capabilities. First and foremost, students are given instant feedback on their performance. Not only is this kind of feedback emotionally neutral, but as a rule it is formative in nature. Meanwhile, the competency-based nature of personalized learning platforms posits that students gradually develop their competencies from task to task building their confidence in their abilities to tackle every other problem on their way towards mastery.

Collaboration. One-to-one laptop environments which are a prerequisite for personalized learning have been described as student-centered, enabling individualized learning with students exercising more control over their learning trajectories [43]. Although the environments of this sort encourage more independent work of students, they also foster collaboration. Studies report an increased use of project-based learning approach as students are better equipped with technologies to find, analyze information and eventually produce original work [44], [45]. Project-based learning promotes social learning as at the heart of this approach lies the problem to be solved collectively. Students are forced to develop communication and negotiation skills when brainstorming new ideas, listening to each other, negotiating the solution to a set problem. An important part of this approach is reflection upon the learning gains and the efficacy of their social interactions [45].

Metacognition. Metacognitive skills also fall into the compound category of the social-emotional skills, as they denote a capability of learning how to learn. Students with strong metacognitive skills are better able to evaluate a task at hand, and have better understanding of how to achieve their goals [8]. Research has shown that students with nascent metacognitive skills are unlikely to spend time planning their learning and reflecting on it, and they tend to be outperformed by those who employ self-regulation strategies in their learning [46].

Self-regulation. Digital personalized platforms could assist students in developing their self-regulation skills. Students might benefit from built-in prompts to engage in planning, and goal-setting. It has also been found that guidance in the form of self-questioning training can foster self-regulating learning skills [47]. This kind of training could be focused on comprehending the problem, connecting with prior knowledge, and reflecting on the learning process with the help of feedback provided by the platform.

5 CONCLUSIONS

Personalized learning holds promise to create a more engaging and an equitable environment for students and serve as a tool to foster social and emotional skills. What is more, digital tools have the potential for bringing personalized learning into action, empowering its results. Besides, personalisation seems to be a favourable context for promoting social-emotional skills. By capturing the key characteristics of PL we intend to stimulate further research on the assessment of the effectiveness of digital tools for personalized learning, which leads to sustainable development of social-emotional skills.

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