Creative Strategies for Making Technology-Based Decisions in Education

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Abstract
The article is dedicated to the specifics of creating creative strategies for making technology-based decisions. The rapid development of digital technologies requires a new type of design of creative thinking, which requires instant, correct and original making of technology-based decisions in the learning process. A study was conducted with a developed author's questionnaire for creative thinking and the formation of creative strategies for making technology-based decisions for education. The study was conducted with 89 students from different specialties of higher education institutions. The results demonstrate that knowing digital technologies from different classes and types, and the skills to needed to use their functionalities, are a predictor, but also a barrier to creative thinking. The advantages and challenges for creative thinking in making technology-based decisions are interpreted. The structuring of creative strategies depends on the knowledge of the technologies used, the motivation to learn and the self-effectiveness of the learners. Respondents form ten spaces of creative strategies for making technology-based decisions in education. According to the analysis of the data received from the respondents, creative strategies for making technology-based decisions motivate active learning and increase the efficiency of daily functioning.

Keywords: Technology-Based Decisions, Creative Strategies, Creative Thinking

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Introduction

The use of digital technologies is a daily occurrence in the learning process both for the teachers from HEIs / higher educational institutions / and for the students from HEIs. The day-to-day running of HEIs students and faculty is also unthinkable without digital technology. In this process of rapid application of digital technologies in education and in life, it is necessary to make technology-based decisions in several aspects.

The first aspect of decision-making is related to decision-making regarding the use of a certain type of technology, the second aspect of decision-making is related to the use of individual functionalities of the chosen technology, the third aspect of decision-making requires a creative interpretation of the acquired knowledge of technologies and their functionalities for the most effective solution of certain problems or implementation of certain activities.

The first two aspects of making technology-based decisions require primarily the application of acquired knowledge and skills, usually decisions are made according to familiar and routine models and traditional performances are made both in everyday life and in the educational process.

The third aspect of making technology-based decisions not only implies, but also requires technology-based decision-making to be based on creative thinking and to construct creative strategies to deal with problems in learning and in everyday life. "Creativity is defined as the ability of the performer to produce decisions that are both new (ie original, rare) and appropriate (ie adequate, useful) in different situational contexts." (Sternberg & Lubart, 1999). The authors place a special focus on the development of creativity by "developing solutions to problems in different gradients of difficulty" in science and education. By providing opportunities for teachers and students of HEIs to make various technology-based decisions with analysis, evaluation and selection of results for solving a problem, conditions for critical and creative thinking are created. "Creativity is needed to generate new ideas to solve problems, and critical thinking evaluates and improves an idea." (Lau, 2011). New creative ideas lead to the conceptualization of creative strategies. The structuring of creative strategies for technology-based decisions in education is influenced by the very specification of technology, motivation to learn and self-effectiveness of students from HEIs, which in turn provoke creative thinking and creative solutions.

Main part

The process of making technology-based decisions in education is dynamic, continuous and is linked to specific solutions that have arisen, such as in education these are problems related to the learning content.

The definition of "decision making" is most often presented as:

- ✓ "selection of a course action from among two or more possible alternatives in order to arrive at a solution for a given problem" (Trewatha & Newport, 1976);
- ✓ "a course of action which is consciously chosen from among a set of alternatives to achieve the desired result" (Drucker, 1999);
- ✓ "cognitive process during which the decision maker is involved in choosing a strategy for action from different options."

✓ Decision making is the selection based on some criteria from two or more possible alternatives (Terry, 2009) and others;

Similarly, "technology-based decision making" in education can be defined as choosing the most correct and effective solution from a variety of alternatives by selecting the most appropriate technology and / or its most appropriate functionalities for solving the problem/ specific solutions in the learning process in the specific situation.

According to the most popular decision-making characteristics rational thinking is included. (Dimitratos, Petrou, Plakoyiannaki & Johnson, 2011; Musso & Francioni, 2012; Parsons, 2016, etc.), Decision-making implies freedom and choice of decision according to the personal characteristics of the decision-maker, his intellectual, emotional and social potential. It is the inclusion of personal characteristics that takes decision-making beyond rationality and includes the creativity of the individual, who brings a new type of creative thinking design with correct and original technology-based decision making in the process of self-teaching or learning.

Decision-making, including technology-based decisions, can be differentiated into strategic, tactical and operational decisions.

Strategic decision-making based on technology is most often implemented at the management level in the following process: goal setting, information retrieval, creating a set of variable solutions, comparisons and interpretation of variable solutions, SWOT analysis of alternative solutions and selection of the right decisions. Strategic decision-making is influenced by "competencies, personality and demographic characteristics and decision makers typology" (Musso & Francioni 2012), reflection (Figueira, Greco, Ehrgott, 2005), artificial intelligence (Elliot, Paananen & Staron, 2020), etc. The strategic making of technology-based decisions is related to the overall goal, which includes many sub-goals in conditions of increased risk and uncertainty and the derivation of multi-alternative scenarios. Usually, strategic technology-based decisions are long-term. Strategic decision-making is associated with rationality (Musso & Francioni, 2012), but the very creation of alternative solutions, their interpretation and selection require creative thinking and a creative approach. In essence, strategic technology-based decision-making involves creative strategies based on the rational handling of facts, processes, multiple goals combined into a common goal and predicting results. In the learning process, strategic technology-based decision-making is more often taken by the HEIs lecturer, who provides, offers and/or allows the use of certain technologies (including digital) according to the curriculum and content. In this context, whether strategic decision-making depends on the creativity of the HEIs teacher. Innovative learning models that lead to the active learning of HEIs students involve the strategic making of strategic technology-based decisions by the teacher and HEIs students. The use of innovative learning models will increase the effectiveness of the decisions made, because it will include the result of brainstorming from creative decisions of students and teachers from HEIs. For the HEIs teacher, strategic technology-based decision-making is about adapting the curriculum to the use of different technologies (including digital), electronic resources used with and from different technologies and deriving their own flexible teaching styles according to the curriculum and potential of HEIs students. Creative thinking, creative decisions and creative performances are introduced into this flexibility. While HEIs students structure (together with the HEIs lecturer) creative creative technology-based decisions that they implement in building their own learning styles.

Tactical decision-making is related to a specific goal, a specific scenario in which the risk is minimized and the achievement of the goal leads to a result. Tactical technology-based decision-making is usually short-term and mediates between strategic and operational technology-based decisions. When making tactical technology-based decisions in the training, creative decisions can also be made by students and teachers from HEIs in the context of solving the specific problem. Again, the assumption is made that the active learning of HEIs students increases due to the opportunities provided to express the creativity of the individual learner and achieve a positive satisfying experience of the result of a proposed or jointly structured specific creative tactics. In the learning process, the teacher from HEIs brings creativity in teaching certain learning content with included technologies, ie. can be creative in choosing models, methods and specific teaching techniques. While HEIs students can realize creative thinking and creative behaviour in various ways, to master certain learning content and dynamics of learning styles.

Operational decision-making based on technology is less common because the use of certain technologies (including digital technologies) is characterized by limitations in the functionality of the technological systems and/or products themselves. Operational technology-based decisions are a consequence of strategic and tactical technology-based decisions, are medium-term and are usually implemented according to a certain algorithm until the effective implementation is mastered. Operational technology-based decision-making in teaching also allows for creativity, because each HEIs teacher/student can bring creative thinking and creative behaviour that will achieve a higher level of individual presentation of teaching or learning.

In the process of making technology-based decisions, new and original ideas inevitably appear creativity in the search for alternative solutions, in evaluating unexpected aspects of alternative solutions and in choosing the right solution. “Creativity is also associated with producing original, high-quality, and “elegant” solutions to complex, novel, or ill-defined problems”(Forte-Celaya, Ibarra & Glasserman-Morales, 2021).

Creativity synergizes with technology-based decision-making, especially in structuring alternative solutions. “Creativity is also related to narrower traits in the areas of emotions and motivation, cognition, social expression, and self-regulation” (Ivcevic & Mayer, 2006).

To realize creativity, technology-based decision-making requires critical, rational and creative thinking. The characteristics of critical thinking refer to: “noticing perceptively and establishing careful connections; asking probing questions and making meaningful distinctions. Critical thinking involves analyzing, interpreting, and evaluating evidence; applying knowledge; thinking independently and interdependently… and includes evaluating and self-direction” (DiYanni, 2016). Critical thinking is the first step for creative thinking as it brings out options for existing but also promising alternative solutions. As noted by Snyder & Snyder (2008), “simply put, students who are able to think critically are able to solve problems effectively” and can obviously make the right technology-based decisions.

Method

The research methodology is composed of constructs from technology-based decision-making theories (Trewatha & Newport, 1982; Drucker, 1999; Terry, 2009; Darioshi & Lahav, 2021); theories of creativity (Taylor, 1971; Getzels & Csikszentmihalyi, 1976; Gardner, 1983; Sternberg, 1985; Kaufman & Baer, 2004; Dietrich, 2004; Kaufman, Glăveanu & Baer,

2017; Jorlen, 2013); self-efficacy theory (Bandura, 1997); to specify and analyze factors that influence the creation of creative strategies for technology-based decision-making in learning.

Research method

An author's questionnaire with 30 items was used for the study. The questionnaire is structured in three parts, with the first and second parts including nine items each, and the third part including 12 items. The first part is related to knowledge about digital technologies of different class, type and skills to use the functionalities of different technologies to make creative decisions. The second part of statements is related to the motivation for learning and making creative technology-based decisions with the output of one's own learning style. The third part of the questionnaire is related to self-efficacy in learning and in daily functioning with making creative technology-based decisions.

Procedure

Respondents answer the questionnaire with “yes” or “no”, thereby rating individual statements as true or false.

Results and discussion

89 respondents - students from higher educational institutions - took part in the survey. The distribution by gender is presented in Table 1.

Participants	Female	Male	No answer	Total (N=89)
Students from HEIs	50	33	6	89

Table 1: Distribution by gender

Answers by gender are presented dichotomously and are not derived in interpretive models even in those cases where respondents did not specify gender, there were no significant differences in responses. All study participants responded to all of the items in the three parts of the questionnaire. In the first group of items, all respondents indicate their preferences for educational and life functioning with the inclusion of digital technologies. Some items have almost ceiling answers (“I make technology-based decisions by searching for information on the Web” - 98% answered “yes”), while at the same time a high emotional commitment to digital technologies in the learning process is presented (“I like to experiment with new digital technologies and new functionalities in the learning process” - 97% answered “yes”). Respondents decisively provide an answer that digital technologies increase their learning outcomes (96%). The answers obtained can be interpreted in two aspects. On one hand, the respondents have digital devices, they use them both for the learning process and in everyday life, the Internet connectivity is high and any necessary information can be found on the Internet. Even efficient Internet surfing requires creative strategies and bears the marks of creativity, because there are many answers on the Internet, but finding the right ones requires correctly specifying search words, phrases, expressions, etc. On the other hand, the forced conducting of training in an electronic environment at a distance in recent years /due to pandemic conditions/ additionally created sustainable attitudes towards and for the digitization of everyday life and the educational process. The use of digital technologies, including the Internet of Things, facilitates educational, social and life functioning and is quite logically preferred and liked.

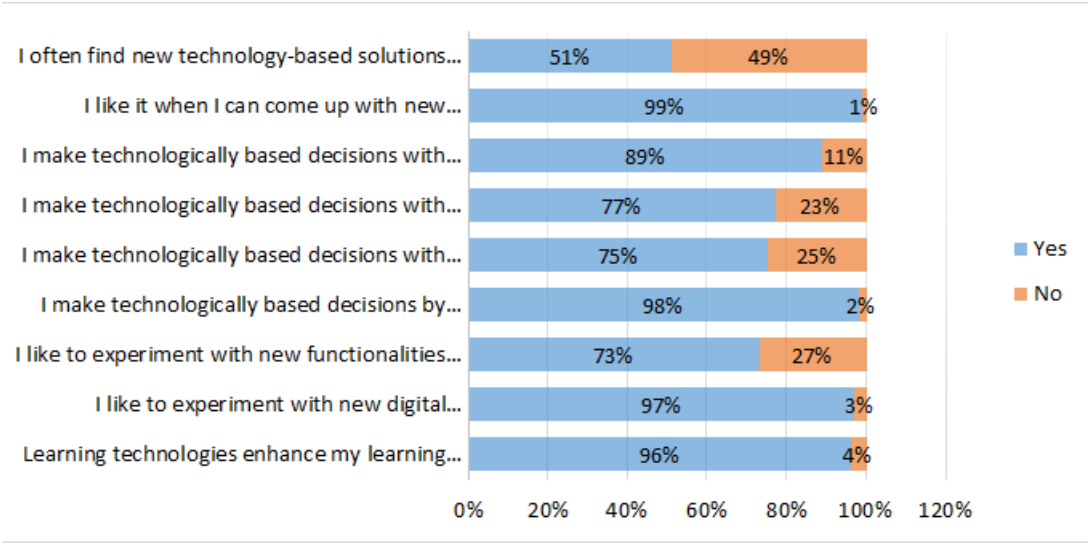

Figure 1: Knowledge and skills of technologies and their functionalities

It is noteworthy that the respondents apply new tactics to facilitate their learning and to increase its results (51%). Although the result is almost average, the very fact of looking for different and new tactical technology-based decisions is eloquent enough for a creative approach to one's own learning with the application of technology-based decisions. Creative behaviour is accepted with a positive emotional commitment by all respondents ("I like it when I manage to make new original technology-based decisions that improve my own learning" 99% answered yes), even those respondents who do not apply creative tactics in and to their own learning. There is clearly an orientation towards a creative approach, the problem-solving algorithm has passed through the stage of critical thinking and follows the direction of creative thinking and creative strategies with the selection of digital technology-based decisions until the problem is solved. The action strategies that present the action plan for solving a problem that has arisen, are based on critical thinking and creative thinking, are associated with setting certain goals, tasks and decision-making for implementations and actions, including technology-based decisions, and achieve a solution of the problem that arose. Technology-based decisions are based on and include different types of strategies: ordinary strategies; coping strategies; creative strategies. According to *Csikszentmihalyi* (1996): "Creativity is about capturing those moments that make life worth living." According to him,

> *creativity,…., consists of three main domains: a set of symbolic rules and procedures; a field that includes all individuals who act as gatekeepers to the domain and decide whether a new idea or product can be accepted; and the individual who uses the symbols of a domain invents a new idea or sees a new pattern. His thoughts or actions change a domain or establish a new domain. The level of creativity in a place at a given time does not depend only on the size of individual creativity. It also depends on how appropriate the respective domains and fields are for recognizing and disseminating new ideas. It is in the space of recognizing and disseminating new ideas that technology-based decisions and their creative creation and implementation are included.*

Undoubtedly, it is necessary to distinguish between solving a technology-based problem and making a technology-based decision. Problem solving is a process related to the analysis of the problem and / or the problematic situation and assumptions about possible different

options for solutions and related choices. Decision-making is an action related to the choice itself and is based on judgment and assumptions. Both problem solving (analytical process) and decision making (active process) are related to competencies (knowledge, skills, values and attitudes) and critical thinking. Creative thinking is the thinking that enables students to apply their imagination to generating ideas, questions, and hypotheses, experimenting with alternatives and to evaluating their own and their peers' ideas, final products and processes." (Kampylis & Berki, 2014).

In the learning process in HEIs, there could be no greater challenge than the possibility of individual/team technology-based decision-making in both faculty and students of HEIs. When this kind of challenge is brought out interactively between teachers and HEIs students, then the responsibility given to HEIs students increases their motivation to succeed and creates conditions for the expression of self-efficacy that creates both subjective and team creative strategies. In this context, an algorithmic scheme can be structured with the domains "creating creative strategies" and "making technology-based decisions" included, which are presented in Figure 2.

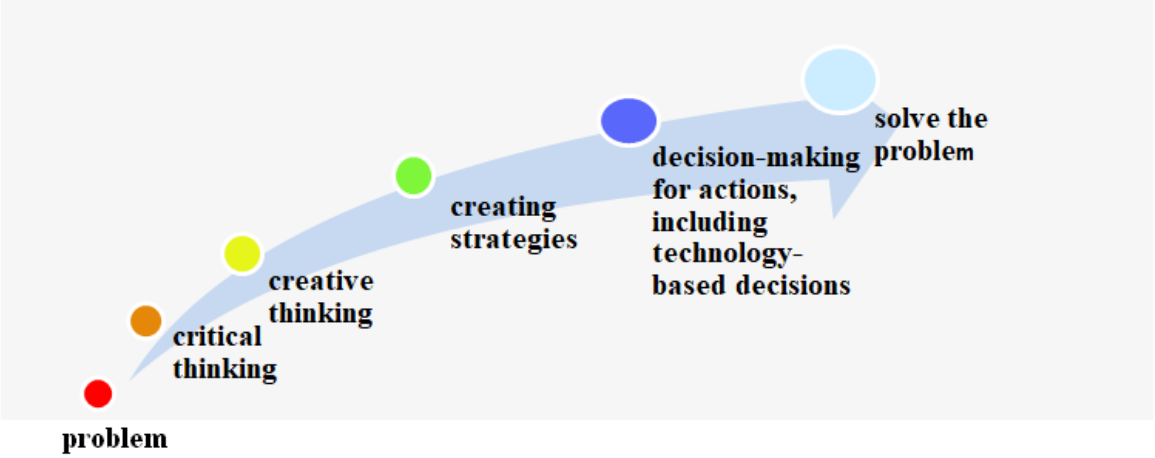

Figure 2: Decision-making algorithm with creative strategies

In turn, creative strategies are determined by:

- ✓ the very nature of the problem that has arisen;
- ✓ digital competences, self-efficacy, motivation and personal characteristics of the individual;
- ✓ environmental factors that stimulate or do not stimulate creativity in decision-making, including technology-based decisions;
- ✓ creative thinking.

A pyramid of the derivation of creative strategies for technology-based decision-making can be formed, which is presented in Figure 3.

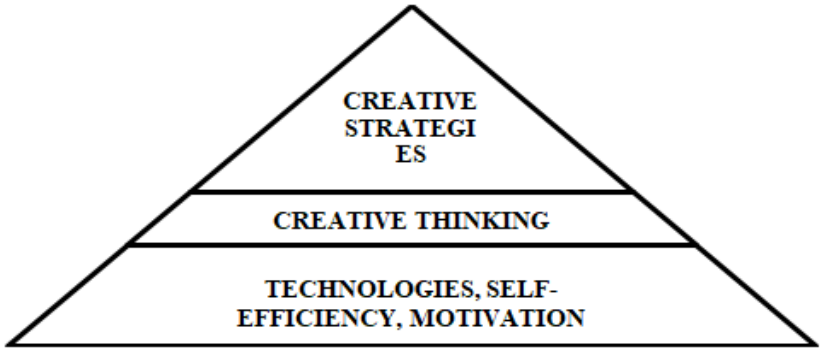

Figure 3: Pyramid of deriving creative strategies for making technology-based decisions

The results of the second part of the questionnaire related to motivation for creative solutions demonstrate internal motivation for making creative technology-based decisions. Indeed, every person daily realizes rational thinking, creativity, critical thinking and creates creative strategies whether or not using technology. But, motivation for creative solutions forces creative behaviour. The highest score for motivation to make creative decisions through technology-based decisions predictably occurs when there is a clear transfer of learning content to real life ("Making technology-based decisions motivates me to understand the application of learning information in real-life situations" - 94% answered "yes") and infers a relationship with emotional positive engagement ("Learning by making technology-based decisions gives me pleasure" - 98% answered "yes"). Learning tasks that are related to challenges such as finding technology-based decisions provoke the setting of goals and sub-goals and support successful achievements. Respondents' preferred models for making technology-based decisions in learning activities are brainstorming (I like making technology-based decisions in brainstorming with my fellow students - 72% answered yes) and collaborative learning ("I am motivated to find solutions of educational tasks in digital collaboration with my fellow students" - 62% answered "yes").

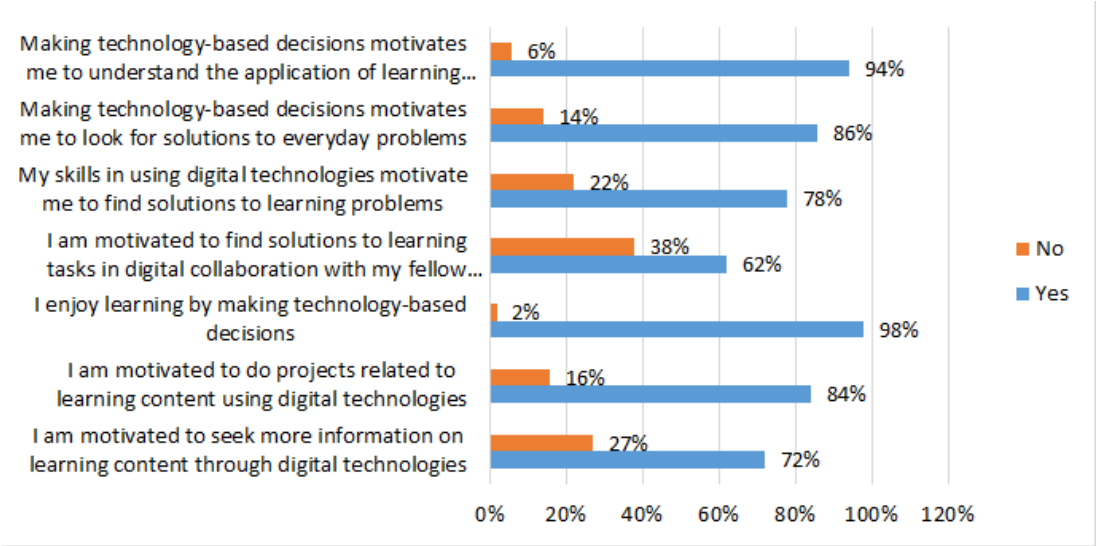

Figure 4: Motivation for creative solutions

At the same time, it relies on making conventional and ordinary solutions to problems (I try out various functionalities of digital technologies to achieve better results in my studies - 46%

answered “yes”), which do not require additional motivation. In a generalized pattern, respondents prefer finding learning information through digital technologies (“I am motivated to search for more information on learning content with digital technologies” - 72% affirmative answers). The stated preferences positively affect the self-efficacy expression of the respondents in making creative technology-based decisions. It is evident from the answers, however, that the respondents are still in a hesitant and unsettled position about the motivation for learning through user and innovative models despite the expressed affinity for digitization with creative applications in their learning. Respondents prefer finding and learning learning content digitally (72%), but they are still in a situation of trying out different functionalities of digital technologies to achieve better results in their studies (54%). Undoubtedly, these results can also be interpreted in the context of increasing digital literacy and digital competences of learners.

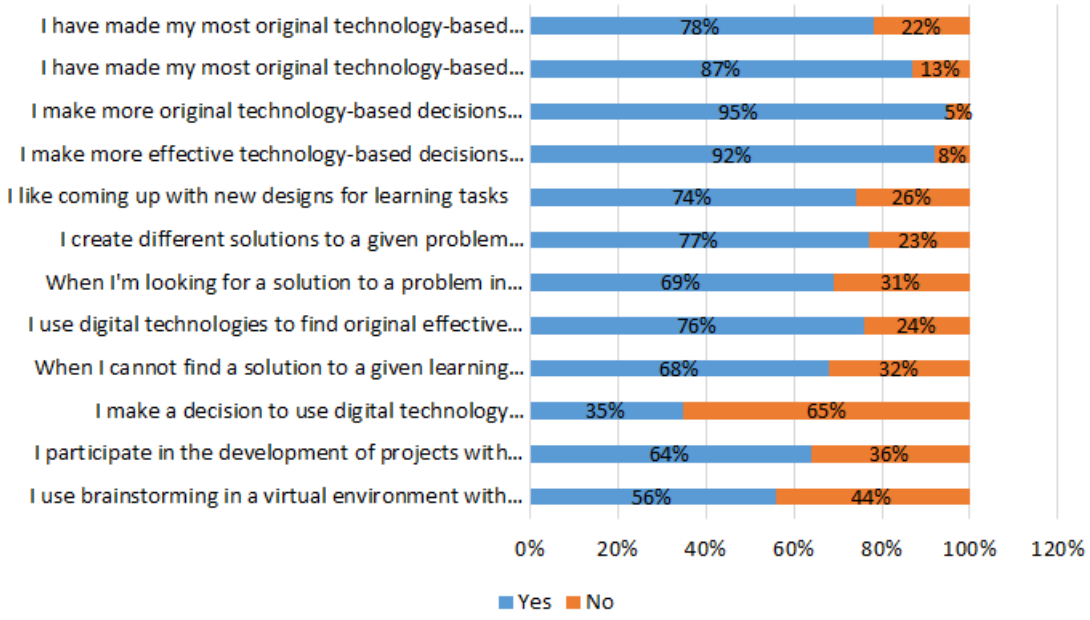

Figure 5: Self-efficacy in making creative technology-based decisions

Any given opportunity to make decisions about the content and style of learning provokes creativity and responsibility for one's own learning. In this context, the self-efficacy of the respondents is high, since the respondents are mainly from the generations “Z” and "Millennials", which are characterized by an active digital presence and an almost digital lifestyle. This fact is also evident from the results obtained related to self-efficacy in making creative technology-based decisions (“I create different solutions to a certain problem using digital technologies and choose the best solution”-77%; “I use digital technologies to finding original effective solutions to problems in learning and in everyday life” - 76%; “When I cannot independently find a solution to a given educational task, I use digital technologies to find options for solutions” - 68%). As influencers for the highest learning self-efficacy project-based digital collaborative learning (64%), virtual collaboration with people from social networks (69%) and virtual brainstorming (56%) are reported. It is noteworthy that differences are introduced regarding the use of digital technologies for different learning tasks (I decide to use digital technologies routinely and equally for all learning tasks - 35% answered “yes”). The obtained results speak eloquently about the creativity of the

respondents, who are not satisfied only with conventional technology-based decisions, but look for opportunities to apply and demonstrate their own creative original strategies and models when making technology-based decisions. The subjective presentation of creative strategies can be interpreted primarily in the context of the motivation for learning and the A-efficiency of learners. The connection between A-efficacy and performance should not be overlooked, because as noted by Levterova-Gadjalova &Tsokov (2021), "even for respondents with the strongest personally perceived self-efficacy, mastery is not unequivocally clear. Self-efficacy has to overcome the barriers of real achievement."

The arsenal of learning strategies with technology-based decision making that turn out to be creative according to the respondents are 10 and can be referred to: digital brainstorming with fellow students (56%), team digital projects with fellow students (64%), finding variants of technology-based decisions from the Internet (68%) and choosing the most effective technology-based decision (77%), digital engagement of people from social circles (69%), creating new designs of learning tasks (74%), making an instant technology-based decision (78%) , intuitive technology-based decision making (87%), technology-based decision making while in a good mood (95%), interactive learning with technology-based decisions (92%).

Undoubtedly, each of the proposed strategies has its strengths and its problematic sides, but when the problematic sides are known then they can be avoided or another strategy can be applied. The choice of one or another proven creative strategy is a symbiosis between tactical and strategic creativity, and in the specific situation of research it is digital creativity. The respondents' digital expertise is important for realizing digital creativity; situational context and environmental factors; engagement (behavioural, emotional and cognitive) and self-efficacy. Kahu, Picton, and Nelson (2019) found those learners' self-efficacy influences interest and enjoyment, and behavioral engagement in technology learning.

Conclusion

Creative technology-based decision-making requires knowledge and skills about the functionalities of different technologies. It is not at all easy to create creative strategies for technology-based decisions for learning tasks. According to Vesisenaho (et al., 2017), the process of creative use of ICT begins with a development of (or coming up with) ideas (creativity, improvisation), which then can be further elaborated by the use of technology for linking ideas or people (capturing, filtering, consolidating, transferring). When motivation to learn is present and HEIs' students show confidence, see that their efforts are valued, demonstrate critical and creative thinking towards learning tasks, work in a positive team environment and exchange concepts and ideas, then engagement and self-efficacy for taking of creative technology-based decisions. As noted by Kahu, Picton, Nelson (2020), engagement is a manifestation of learner reflection and indicates the learner's framework, evaluation of himself in relation to the current learning task or context, and may also manifest as self-efficacy, belonging and/or well-being. In the future research spaces, questions remain open about the influences and relationships of self-efficacy in structuring creative strategies in technology-based decision-making with the results obtained and the productivity of the applied creative strategy in the learning process.

It is undeniably clear that when innovative learning models are implemented with active learning models created in a virtual environment and with digital technologies, then students from HEIs go beyond the boring passive reproduction of knowledge and skills and become

active creators of their own and other competences, create creative strategies that they can apply both in the learning process and in any area of real life, in any life situation.

Thus, the art of structuring creative strategies for making technology-based decisions in the learning process acquires a personalized meaning and is relevant to the entire life cycle of learners.

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References

Bandura, A. (1997). *Self-efficacy: The exercise of control.* W H Freeman/Times Books/ Henry Holt & Co.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York: Harper/Collins.

Darioshi, R., & Lahav, E. (2021). The impact of technology on the human decision-making process. *Human Behavior and Emerging Technologies*, *3*(3), 391-400. https://doi.org/10.1002/hbe2.257

Dietrich, A. (2004). Neurocognitive mechanisms underlying the experience of flow.*Consciousness & Cognition*,13, 746–761.

Dimitratos, P., Petrou, A., Plakoyiannaki, E. and Jonhson, J. (2011). Strategic decision-making processes in internationalization: Does national culture of the focal firm matter. *Journal of World Business*, ELSEVIER, 46,194-204.

DiYanni, R. (2016). *Critical and creative thinking: A Brief guide for teachers*. New York: Wiley Blackwell.

Drucker, P. F. (1999). *Management challenges for the 21st century*. New York: Harper Business.

Elliot, V. H., Paananen, M., & Staron, M. (2020). Artificial intelligence for decision-makers. *Journal of Emerging Technologies in Accounting*, 17(1), 51-55.

Forte-Celaya, J., Ibarra, L. & Glasserman-Morales, L.D. (2021). *Analysis of Creative Thinking Skills Development under Active Learning*. Strategies *Education Sciences* 11, 10, 621. https://doi.org/10.3390/educsci11100621

Gardner, H. (1983). *Frames of mind*. New York: Basic Books.

Getzels, J. W., & Csikszentmihalyi, M. (1976). *The creative vision: A longitudinal study of problem solving in art*. New York: Wiley.

Greco, S., Ehrgott, M., & Figueira, J. R. (Eds.) (2016). *Multiple criteria decision analysis: state of the art surveys*. (2nd ed.) (International Series in Operations Research and Management Science; Vol. 233). Springer. https://doi.org/10.1007/978-1-4939-3094-4

Ivcevic, Z., & Mayer, J. D. (2006). Creative types and personality. *Imagination, Cognition and Personality, 26*(1-2), 65–86. https://doi.org/10.2190/0615-6262-G582-853U

Jorlen, A. (2013). Five types of creative thinking. *Adam Jorlen's personal website. Retrieved* on 20.07.2019. URL: https://adamjorlen.com/2013/06/10/five-typesof-creative-thinking/

Kampylis P, Berki E. (2014). *Nurturing creative thinking. Geneva (Switzerland): International Bureau of Education (UNESCO) in collaboration with the International Academy of Education* (IAE). JRC81937

Kahu, E. R., Picton, C., & Nelson, K. (2019). *Pathways to engagement: A longitudinal study of the first-year student experience in the educational interface.* Higher Education. https://doi.org/10.1007/s10734-019-00429-w

Kahu, E.R., Picton, C. & Nelson, K. (2020). *Pathways to engagement: a longitudinal study of the first-year student experience in the educational interface*. Higher Education, 79 (4). https://doi.org/10.1007/s10734-019-00429-w

Kaufman, J. C. & Baer, J. (2004). Sure, I'm Creative - But Not in Mathematics!: Self-reported creativity in diverse domains. *empirical studies of the arts* 22(2):143-155. doi:10.2190/26HQ-VHE8-GTLN-BJJM

Kaufman, J.C., Glăveanu, V.P. & Baer J. (2017). *The Cambridge handbook of creativity across domains Cambridge*, UK: Cambridge University Press.

Lau, J.Y.F. (2011) An Introduction to Critical Thinking and Creativity: Think More, Think Better. *John Wiley and Sons Inc*., Hoboken, 26. http://dx.doi.org/10.1002/9781118033449

Levterova-Gadjalova, D. & Tsokov, G. (2021). Self-efficacy of heis students during distance learning in an electronic environment. *ISEIC* - International Conference on *Innovations in Science and Education, 2021.* Book of Abstracts - p. 58., https://www.cbuic.cz/wp-content/uploads/BoA/BoA2021.pdf

Musso, F., & Francioni, B. (2012). Foreign markets entry mode decision for Italian Small and Medium-Sized Enterprises. *International Journal of Business and Management, 7*(2), 3-16. http://dx.doi.org/10.5539/ijbm.v7n2p3

Snyder, L. G., & Snyder, M. J. (2008). Teaching Critical Thinking and Problem Solving Skills. *Delta Pi Epsilon Journal*, 50, 90-99.

Sternberg, R. J. (1985). Implicit theories of intelligence, creativity, and wisdom. *Journal of Personality and Social Psychology*, *49*, 607–627.

Sternberg, R. J., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. *In R. J. Sternberg (Ed.), Handbook of creativity* (3-15). Cambridge: Cambridge University Press.

Taylor, I. A. A (1971). Transactional approach to creativity and its implication for Education. *Journal of Creative Behavior*. https://doi.org/10.1002/j.2162-6057.1971.tb00890.x

Terry, G. (2009). (ed.) Climate Change and Gender Justice. Working in Gender and Development Series. *Oxfam and Practical Action Publishing*. ISBN 9781853396939

Trewartha, R.G. & Newport, N.G. (1976). *Management: Functions and Behavior*. Dallas: Business Publications.

Vesisenaho, M., Dillon, P., Havu-Nuutinen, S., Nousiainen, T., Valtonen, T., & Wang, R. (2017). Creative Improvisations with Information and Communication Technology to Support Learning: A Conceptual and Developmental Framework. *Journal of Teacher Education and Educators*, 6 (3), 229–250.