ERUDITIO-EDUCATIO 2024/2 (19. vol.)
Tanulmányok / Studies 32-41

First results of a pilot research with the application of ICT tools:
The introduction of the model of Flow-based pedagogy[1]

Dalma Lilla Dominek – Nóra Barnucz

Abstract
Today, one of the most important tasks of higher education is to develop students' competencies that can be effectively utilized in the labour market. The alignment between higher education and the labour market deserves special attention, which is mostly justified by the fact that new positions appear in the labour market (e.g. digital police officer). Students are expected to be alert, independent and creative. This expectation is reinforced by the Flow-based pedagogical model, in which the author incorporates creativity, playfulness or even humour. Students thrive in an educational environment where they are challenged to think, solve problems, and collaborate. One of the purposes of the experiential education is to immerse students into the flow channel and merge with the experience. The classroom research was conducted in study and control groups of English classes for Law Enforcement (2021/2022). In this research, we examine the effect of teaching with ICT tools (Augmented Reality - AR; HY-DE model) on students' Flow State (Flow State Questionnaire) and the development of their vocabulary knowledge (pre & post-tests) along with the introduction of the Flow-based pedagogical model. We assume that the students in ICT-based classes achieve a higher flow state than those who are supported by traditional teaching methods. According to the results, the students in the study groups experienced a deep flow state (over 80%) due to the ICT-supported lessons, providing challenges and experiences for them.
Keywords: creativity; Flow-based pedagogy model; educational methodology; Augmented Reality
Subject-Affiliation in New CEEOL: Social Sciences – Education – Higher Education
DOI: 10.36007/eruedu.2024.2.032-041

1 "Project No. TKP2021-NKTA-51 was realized with the support of the Ministry of Culture and Innovation from the National Research Development and Innovation Fund, financed by the TKP2021-NKTA tender program."

1. Introduction

FLOW

Representatives of positive psychology (Pléh, 2004, 2012) underscore the significance of the joy of learning and development, the cultivation of self-esteem, the perception of success as a rewarding experience, the crucial role of active effort and curiosity in pedagogy. According to Mihály Csíkszentmihályi, the father of "Flow theory" (2012) there is a need for a novel psychology that employs scientific methodologies to direct individuals' focus on a deeper understanding of human nature. Csíkszentmihályi places great emphasis on the power of joy and advocates its conscious experience in every moment. In his view, the primary motivator is the state of flow, which has a positive effect on academic performance. According to this perspective, it is crucial to accentuate that humans possess the capability to experience happiness and make right decisions (Seligman & Csíkszentmihályi, 2000; Seligman, 2002; Szondy, 2010; Oláh, 2004, 2012). Based on these observations, the positive direction can also be found in positive pedagogy characterized by its core elements such as student-centeredness, the presence of a creative instructor, and the integration of positive educational influences, methods and tasks (Gottman & Declaire, 2016). The study presents how this positive approach can be effectively implemented in higher education. From the perspective of instructors, the most important consideration is that they will have to be prepared for the adoption of this teaching methodology, as their immersion in the flow channel facilitates the application of creative educational approaches in the classroom. This alignment with the principles of positive psychology and pedagogy underscores how the flow channel can contribute to the development of talents in higher education (Dominek, 2021a).

AR

Augmented reality (AR) has received increasing attention over the last two decades. AR enables the layering of information (e.g. text, sound, animation, video, 3D models) to enable new ways of learning. This characteristic has led the Horizon Report 2011 to confirm that AR can rapidly open up new possibilities for teaching, learning, research and other creative uses (Avila-Garzon et al., 2021). The advantage of AR is that virtual objects or information can be layered on top of physical objects or environments, resulting in a mixed reality in which virtual elements can be meaningfully combined with the real environment to augment the learning environment. The study of AR processes supporting learning and teaching is a popular area of educational research today. AR is inspiring many research communities as it enables practices that would not be possible with other technologies and approaches. AR offers high visualisation, lower cognitive load and new, advanced forms of interactivity. The majority of AR applications can be used in a wide range of learning domains, such as science, engineering and social sciences (Cipresso et al., 2018). Research related to the use of AR for educational purposes has confirmed the positive impact of AR on students' learning outcomes and motivation (Ibañez et al., 2020). Also, it is worth remembering that AR (as many other techno-

logy tools) can be used for content consumption and content creation. According to our experiences, content creation may have stronger positive effects on students' learning outcomes.

HY-DE model

The rise of the digital world at an unprecedented speed has generated changes in all areas of life. The change in media use, the information overload, and the increased need for visual stimuli have an impact on reading habits and thus on learning in many ways. Many domestic and international studies deal with the declining popularity of reading, with the problem of the deterioration of reading comprehension (PISA, PIRLS, national competence measurement), with changes in learning habits. The purpose of the model is to consciously manage hyper- and deep-attention dynamics and phase changes, by making use of the emphasis and positive aspects of hyper-attention, to activate deep attention in order to make learning effective. HY-DE consists of two phases: the first is the instructor phase (in a higher education environment, this is the theoretical part of the given course), the second is the self-active student phase (the seminar part of the course). In the overlapping sections, the theoretical and seminar classes are divided into three parts: 30+30+40 minutes for a 100-minute university course. In the first 30 minutes of the instructor phase, multimediality, hyper-attention, some Rabinowiczian attention/perception, signification rules are typical; in the second 30 minutes, in the decreasing multimedia environment, the mixed attention state and the configuration come to the forefront, then in the last 40 minutes, in addition to monomediality, the state of deep attention is activated, the rule of coherence prevails. In the instructor phase, the same course material is presented three times, following the dynamics and methodology above. The self-active student phase is based on the same attention-shifting dynamics, but in the opposite direction: students are given a task that is based on "learning by doing", but now starting from deep attention activity, they lead through the mixed attention phase to the hyper attention phase. Rabinowitz's reading rules also apply when solving tasks customized to individuals or groups, as reading comprehension is absolutely necessary to solve the given task (Dani, 2014).

2. Theoretical aspects

One of the primary responsibilities in public and higher education is supporting the development of students' competencies in pedagogical and psychological aspects, which requires a transformative shift in teachers' attitudes. The development of communication, digital competence, and creativity represents substantial importance both in educational context and the labour market, and these objectives can be achieved through the application of experiential pedagogy. However, for skill development, it is already a fundamental requirement in education that teachers actively engage students using the flow channel (Csíkszentmihályi, 2010; Dani, 2014; Dominek, 2021b). If students can neglect to consider time and environment

during the lesson, they are automatically placed in the flow channel. Consequently, the instructor has the opportunity to develop the students' creativity and maintain their attention (Dominek, 2022; Dominek & Barnucz, 2022).

The concept of creativity is employed in various contexts such as the acts of creation and production. However, in psychology, it assumes a distinct meaning – an internal process rooted in curiosity that is not entirely separate from intelligence but remains an autonomous activity. Francis Galton, the father of creativity research, emphasized in 1869 that the era of traditional intelligence tests had concluded and there was a need for a completely new personality test. These creativity assessments are commonly known as multi-solution tests, where creativity is indicated not by the quantity of solutions, but the novelty of responses. In our perspective, more refined personality tests or assessments of decision-making tasks with interactive elements are preferable to higher-level intelligence tests. Testing is meaningful when the aim is to measure characteristics that describe an individual's orientation. Although certain aspects depend on the individual's intellectual capacity, the majority are linked to his/her personality.

Many authors and scientific subdisciplines have extensively addressed the psychological aspect of creativity, establishing its profound significance. According to Guilford (1950), the concept of creativity is associated with a wide range of phenomena, resulting in diverse approaches and conceptualizations. One of them frequently associates creativity with the concept of originality, although it acknowledges that originality represents only one aspect of creativity. Another alternative approach identifies creativity not as a singular phenomenon but as a syndrome or complex entity (Guilford, 1950). Unsworth (2001) introduced the concept of creative requirements. For instance, a marketing specialist is entrusted with developing a new campaign for a client and identifying specific challenges in previous campaigns to meet the client's needs effectively. The creative achievement and the performance of a marketing specialist as well – staying with the example above – is driven by the previously planned expectations, whose submitted material is assessed based on his/her abilities. However, the significance of creativity is not exclusively confined to occupational roles. Most research on creativity has focused on examining the processes and conditions that lead to creativity, particularly in areas, where creative demands are high, with special regard to the educational system. According to Gyarmathy (2011), creative thinking cannot be reduced to a divergent approach. In the creative process, the two types of thinking complement each other, operating simultaneously and alternately, coming to the forefront or receding into the background based on the task. She emphasizes that the development of a creative personality is also connected to the functioning of the nervous system, and its development is influenced by environmental factors.

Creativity can be conceptualized as a process consisting of different steps (Amabile, 1996), wherein the initial step involves the recognition of the problem to be solved. The second step is the preparation phase, in which information about the problem area is gathered from external sources. In the third step, the idea generation phase, multiple solutions to the problems are created. These potential solutions are then assessed in the fourth step to determine which solution best

addresses the problem and meets all the requirements. For the solution to be effective, it must be implemented in the fifth and final step. Motivated individuals are believed to actively participate more frequently in the problem-finding process and invest more effort in the idea-generation stage. This is why research on organizational creativity often focuses on motivational factors. In addition, individuals – who possess a comprehensive understanding of their field – are considered to be better equipped to identify relevant information and assess which solutions are the best fit. Knowledge can be acquired formally or informally, through education or on-the-job learning. Subsequently, individuals require specific skills associated with creativity, such as divergent thinking abilities, an innovative cognitive style, or a predisposition to challenge traditional approaches. These creativity-related skills provide the input necessary for problem-solving. Creativity has crucial importance in increasing competitiveness, improving the export of capacity, maintaining employment, and raising the level of services; in other words, it is enhancing social welfare.

3. Research sample and method

The research was carried out in the academic year 2021/2022, as part of a classroom experiment, where AR software (Aknai, Czékmán & Fehér, 2021) and the HY-DE model (Dani, 2014) were implemented to measure their added value in facilitating the students' individual flow states during the lessons and the development of their vocabulary acquisition in ESP classes for Law Enforcement (Barnucz, 2020; 2022). The classroom research was conducted with the involvement of study and control groups (n=33). In the control group, the teaching material was supported using traditional methods and without the involvement of technical devices (n=10). In study group 1, the AR software was applied (n=11), while in study group 2, the AR software was supplemented with the application of the HY-DE model as a methodology to improve students' vocabulary knowledge and maintain their individual flow states during the lessons (n=12). The question may arise regarding whether traditional or Internet-based solutions/tools contribute to a higher individual flow state for students and could be more effective in the acquisition of professional language terms in the context of ESP classes. It is assumed that the use of digital devices provides better assistance to students in acquiring new vocabulary and has a positive impact on their involvement (individual flow state) in the teaching and learning process. The research employs the following measurement tools:

At the outset of the pilot research, the students' learning styles were assessed using the 44-question Felder-Soloman learning style questionnaire, which meets the criteria of goodness: (1) objectivity, (2) validity, (3) reliability.

Both at the outset and the conclusion of the classroom research, the current vocabulary proficiency of the students was measured with the use a self-constructed knowledge level test. Following each test session (2 sessions), we measured the flow state of the students using the 20-item Flow State Questionnaire (hereinafter: FSQ) adapted by Dalma Dominek at the LUPS and validated by Magyaródi et al. (2013) (Dominek, 2020).

4. Results

Based on the results, no difference was observed in the students' individual flow states in the study groups: the students consistently experienced a deep flow state (over 80%) due to the application of digital technology, while among the students of the control group (where teaching occurred without the application of the AR and HY-DE model) there was a lack of engagement during the transmission of course material, indicated by values were below 80% (Table 1-2).

Table 1. The students' flow state results of the 1st measurement

	n	Average	Percentage	Standard dev.	Group
Challenge-skill balance	12	46,92	**85,31**	6,32	Study Group 1
Merging with the experience	12	36,42	**80,93**	5,76	Study Group 1
Challenge-skill balance	11	45,82	**83,31**	6,98	Study Group 2
Merging with the experience	11	37,00	**82,22**	4,40	Study Group 2
Challenge-skill balance	10	36,18	65,78	11,41	Control Group
Merging with the experience	10	20,09	44,65	9,68	Control Group

Source: the authors' own edition

Table 2: The students' flow state results of the 2nd measurement

	n	Average	Percentage	Standard dev.	Group
Challenge-skill balance	13	49,38	**89,78**	4,17	Study Group 1
Merging with the experience	13	38,77	**86,16**	5,26	Study Group 1
Challenge-skill balance	8	47,88	**87,05**	5,11	Study Group 2
Merging with the experience	8	39,25	**87,22**	2,92	Study Group 2
Challenge-skill balance	10	39,05	71,81	12,93	Control Group
Merging with the experience	10	27,06	61,33	9,38	Control Group

Source: the authors' own edition

According to our hypotheses, the utilization of ICT-based teaching materials has exhibited a positive impact on the development of the students' individual flow states, as proven by the preliminary findings of the research. Consequently, it can be concluded that the students perceived the application of these tools/methods in the classroom as both challenging and enriching in experiences (Labancz & Barnucz, 2016). In the forthcoming analysis, descriptive statistics, correlation studies, and difference analyses will be conducted to explore the relationships between students' vocabulary knowledge and their learning style.

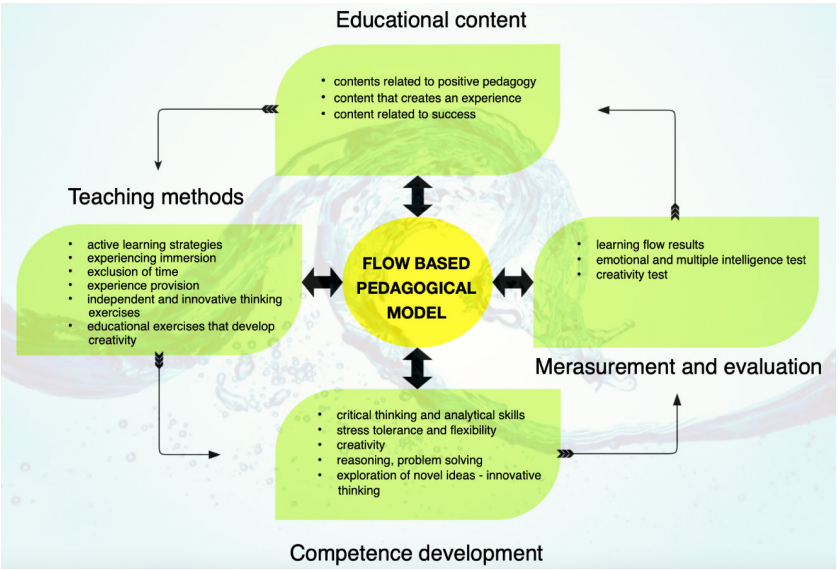
The results demonstrate that creative-based pedagogy effectively guides participants in education into the flow channel. Consequently, the pedagogical model of

flow emerges as an effective method for creativity-based learning. In light of these findings, it can be concluded that the training for the development of creativity at the LUPS plays a significant role in achieving a flow state. The key finding of the research is that accessing the flow channel has become achievable for students. Therefore, it can be asserted that the training for the development of creativity provided meaningful experiences and challenges for them. It is essential to emphasize that instructors of Generation Z should conduct lectures and seminars based on experiences, supporting independent thinking among students. In our perspective, creativity can be cultivated through experiences, making it imperative to expand the instructors' toolkit in this direction in the near future (Dominek, 2021b).

5. Discussion and conclusion

In the teaching-learning process, it is imperative to consider two fundamental conditions simultaneously. First, there is the fact that the learning habits of Generation Z (those born between 1995 and 2009) in both public and higher education have changed compared to previous patterns, requiring that instructors adapt to these shifts in all forms of education. Second, a primary objective of higher education is to develop competencies among students that can be effectively applied in the labour market. The author of the model characterizes it as an innovative educational approach that is capable of planning educational content, implementing pedagogical methods, supporting the development of competencies, and measuring and evaluating this process (Figure 1).

Figure 1: Flow-based pedagogical model



Source: Dalma Lilla Dominek's own model, Dominek 2022

We believe that the research has demonstrated the necessity of introducing the flow-based pedagogical model during experiential education to enhance educational creativity. This approach enables the integration of educational pedagogy into lessons with the assistance of the teacher, facilitating the guidance of students into the flow channel.

By applying the Flow-based pedagogical model in education, students would engage in experience-based learning, which is a crucial approach, where teachers have the opportunity to develop soft skills, including creativity, communication, conflict management, and sensitization. An essential aspect of creativity involves the practical application of a creative approach, the utilization of various problem-solving methods, the development, and implementation of functional ideas. Failure to recognize one's autonomy and opportunities for self-expression can result in a loss of creativity. The most important thing is that students need to be willing to embrace a new way of thinking in education, adopt innovative ideas, learn from others, and inspire their peers. Students should possess the ability to adapt flexibly to uncertain situations and have the tools to navigate through complex problems.

We contribute to the literature by investigating the role of creativity and the experience of flow in education. Our findings can enhance the development of our knowledge of flow experience by providing a slightly clearer perspective on the two factors, namely challenge-skill balance & merging with the experience.

References

Aknai, Dóra Orsolya – Czékmán, Balázs – Fehér, Péter (2021): Kiterjesztett valóság (AR) alkalmazások használata és készítése az iskolában. In: Maisch, P. – Márhoffer, N. – Molnár-Kovács, Zs. – Szekeres, N. – Szűcs-Rusznak, K. (szerk.) *Iskola a társadalmi térben és időben VII.* (pp. 150–156). Pécs: PTE BTK „Oktatás és Társadalom" Neveléstudományi Doktori Iskola.

Amabile, Teresa M. (1996): *Creativity in the Context*. Boulder, CO: Westview Press.

Avila-Garzon, Cecilia – Bacca-Acosta, Jorge – Kinshuk, Duarte Joan – Betancourt, Juan (2021): *Augmented Reality in Education: An Overview of Twenty-Five Years of Research. Contemporary Educational Technology*, 13(3), 1–29.

Barnucz, Nóra (2020): A kiterjesztett valóság alkalmazása a nyelvoktatásban különös tekintettel a rendészeti szaknyelvre. *Educatio*, 29 (4), 644–652. DOI: https://doi.org/10.1556/2063.29.2020.4.9

Barnucz, Nóra (2022): Digitális pedagógia alkalmazásánal lehetőségei a rendészeti szaknyelvi órán. *Magyar Rendészet*, 22 (2), 183-196. DOI: https://doi.org/10.32577/mr.2022.2.12

Cipresso, Pietro – Chicchi Giglioli – Irene A. – Alcaniz Raya, Mariano – Riva, Giuseppe (2018): The Past, Present, and Future of Virtual and Augmented Reality Research: A Network and Cluster Analysis of the Literature. *Frontiers in Psychology*, 9, 2086. https://doi.org/10.3389/fpsyg.2018.02086

Csikszentmihalyi, Mihály (2000): Happiness, flow, and economic equality. *American Psychologist*, 55 (10), 1163-1164. DOI: https://doi.org/10.1037/0003-066X.55.10.1163

Csíkszentmihályi, Mihály. (2010): *Flow – az áramlat – a tökéletes élmény pszichológiája*. Budapest: Akadémiai Kiadó.

Csíkszentmihályi, Mihály. (2012): A megszólított pszichológia. *Magyar Pszichológiai Szemle*, 67 (1), 47–56

Dani, Erzsébet (2014): 'A kétfázisú HY-DE-modell: A hiper- és mélyfigyelem fázisváltásai a katedrától a hallgatói önfejlesztéséig'. *Informatika a felsőoktatásban konferencia*.

Dominek, Dalma Lilla (2020): *Flow avagy játékos kommunikáció a múzeumokban*. Szeged: Szegedi Egyetemi Kiadó, Belvedere Meridionale.

Dominek, Dalma Lilla (2021a): *Creativity in higher education through the flow channel*. Belvedere Meridionale, 33 (4), 5–12. DOI: https://doi.org/10.14232/belv.2021.4.1

Dominek, Dalma Lilla (2021b): A flow mint pozitív pszichológia jelenléte az oktatásban. *Erudito – Educatio*, 16 (4), 72–82.

Dominek, Dalma Lilla (2022): On a Flow-based pedagogical model: The emergence of experience and creativity in education. *Erudito – Educatio*, 17 (3), 72-81.

Dominek, Dalma Lilla & Barnucz, Nóra (2022): The Educational Methodology of Flow at the University of Public Service. *Practice and Theory in Systems of Education*, 17 (1) -7.

Gottman, John & Declaire, Joan (2016): *Gyerekek érzelmi intelligenciája. Nevelés szívvel-lélekkel*. Budapest: Jaffa Kiadó.

Guilford, Joy Paul (1950): Creativity. *American Psychologist, 5 (*9), 444–454.

Gyarmathy, Éva (2011): Kreativitás és beilleszkedési zavarok. In Münnich, Á. (szerk.) *A kreativitás többszempontú vizsgálata* (pp. 13-45). Debrecen: Debreceni Egyetem – Didakt Kiadó.

Ibañez, María – Uriarte, Aaldo – Zatarain, Ramón – Barrón, María (2020): Impact of augmented reality technology on academic achievement and motivation of students from public and private Mexican schools. A case study in a middle-school geometry course. *Computers & Education,* 145, 103734.

Labancz, Imre – Barnucz, Nóra (2016): Kísérlet az IKT-eszközhasználat hatásának vizsgálatára hallgatók körében.'' In Pusztai, G., Bocsi, V. & Ceglédi, T. (szerk.) *A felsőoktatás (hozzáadott) értéke. Közelítések az intézményi hozzájárulás empirikus megragadásához.* Budapest – Nagyvárad: Új Mandátum PPS. pp. 262–277.

Magyaródi, Tímea – Nagy, H. – Soltész, P. – Mózes, T. – Oláh, Attila (2013): Egy újonnan kidogozott flow állapot kérdőív kimunkálása és pszichometriai jellemzőinek bemutatása. *Pszichológia*, 33 (1), 15-36. DOI: https://doi.org/10.1556/pszicho.33.2013.1.2

Oláh, Attila (2004): Megküzdés és pszichológiai immunitás. In Boross, A (szerk.) *Bevezetés a pszichológiába: Olvasmányok és feladatok a lélektan alapkérdéseinek tanulmányozásához*. Budapest: Osiris Kiadó. pp. 631–664.

Oláh, Attila (2012): *A pozitív pszichológia világa*. Budapest: Akadémiai Kiadó.

Pléh, Csaba (2004): A pozitív pszichológiai hagyományok Európában. *Iskolakultúra*, 14 (5), 57–61.

Pléh, Csaba (2012): A pozitív pszichológiai szemlélet előfutárairól. *Magyar pszichológiai szemle*, 67 (1), 13-18. DOI: https://doi.org/10.1556/MPSzle.67.2012.1.2

Seligman, Martin E. P. – Csíkszentmihályi, Mihály (2000): Positive psychology. An introduction. *American Psychologist*, 55 (1), 5-14. DOI: https://doi.org/10.1037/0003-066X.55.1.5

Seligman, Martin E. P. (2002): *Authentic Authentic Happiness: Using the New Positive Psychology to Realize Your Potential for Lasting Fulfilment*. New York: Free Press.

Szondy, Máté (2010): *A boldogság tudománya. Fejezetek a pozitív pszichológiából*. Budapest: Jaffa Kiadó.

Unsworth, Kerrie L. (2001): Unpacking creativity. *Academy of Management Review*, 26. 289–297.