

Review article / Pregledni znanstveni članek

## Gamification in nursing: a literature review Igrifikacija v zdravstveni negi: pregled literature

Nino Fijačko<sup>1,\*</sup>, Lucija Gosak<sup>1</sup>, Nika Debeljak<sup>1</sup>, Pavel Skok<sup>2</sup>, Gregor Štiglic<sup>1,3</sup>, Leona Cilar<sup>1</sup>

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**Ključne besede:** andragogika; učne enote; igrifikacija; elementi iger; zdravstvena nega

<sup>1</sup> University of Maribor, Faculty of Health Sciences, Žitna ulica 15, 2000 Maribor, Slovenia

<sup>2</sup> University of Maribor, Faculty of Medicine, Taborska ulica 8, 2000 Maribor, Slovenia

<sup>3</sup> University of Maribor, Faculty of Electrical Engineering and Computer Science, Koroška cesta 46, 2000 Maribor, Slovenia

\* Corresponding author /  
Korespondenčni avtor:  
nino.fjacko@um.si

### ABSTRACT

**Introduction:** With new generations of students entering the educational system and calling for novel adult-learning approaches, such as gamification, traditional didactics seem to be diminishing in importance. The aim of this paper is to introduce gamification as a novel concept in adult learning and to present its impact on nursing education.

**Methods:** Through a combination of 2dSearch, Publish or Perish and PubMed2XL applications and the set criteria, we used the Google Scholar and Medline / PubMed search engines to compile, analyse, and synthesise studies related to gamification in correlation with the educational process in the field of nursing. To assess the level of methodological quality of research, we used the Mixed Methods Appraisal Tool (MMAT).

**Results:** The final analysis included nine studies related to gamification in nursing course units. Most often, game elements in the form of badges and feedback were included. Most research studies reported a positive impact of gamification on nursing students in the form of increased motivation and engagement, with only one survey reporting a negative impact in the form of inappropriateness and inefficiency. The evaluation of the included studies according to the MMAT tool showed a medium level of methodological quality.

**Discussion and conclusion:** Gamification is a relatively new concept in nursing education and represents the potential for a more advanced way of conveying information. In the future, research should be carried out to clarify the concept of gamification and examine the possibilities of its implementation in the educational environment in Slovenia.

### IZVLEČEK

**Uvod:** V sodobnem času tradicionalna didaktika izgublja svoj pomen, saj v izobraževalni sistem vstopajo nove generacije študentov, ki zahtevajo novejšo andragoške pristope, kakršna je na primer igrifikacija. Namen članka je predstaviti igrifikacijo kot nov andragoški koncept in njen vpliv na izobraževanje v zdravstveni negi. **Metode:** S kombinacijo aplikacij 2dSearch, Publish or Perish in PubMed2XL ter zastavljenimi kriteriji smo z iskalnikoma Google Scholar in Medline / PubMed izvedli iskanje, analizo in sintezo raziskav, ki se nanašajo na igrifikacijo v povezavi z učnim procesom v zdravstveni negi. Z orodjem Mixed Methods Appraisal Tool (MMAT) je bila izvedena ocena stopnje metodološke kakovosti raziskav.

**Rezultati:** V končno analizo je bilo vključenih devet raziskav, ki so se nanašale na igrifikacijo v učnih enotah zdravstvene nege. Najpogosteje so bili vključeni elementi igre v obliki značk in povratnih informacij. Večina raziskav ugotavlja, da igrifikacija pozitivno vpliva na študente zdravstvene nege v obliki dviga motivacije in sodelovanja, le ena raziskava poroča o negativnih vplivih v obliki neprimernosti in neučinkovitosti. Ocena vključenih raziskav po orodju MMAT je prikazala srednjo stopnjo metodološke kakovosti.

**Diskusija in zaključek:** Igrifikacija je relativno nov koncept na področju učnih enot v zdravstveni negi in predstavlja potencial za naprednejši način posredovanja informacij. V prihodnosti bi bilo treba izvesti raziskave, ki bi razjasnile koncept in preverile možnosti implementacije igrifikacije v učno okolje v Sloveniji.



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## Introduction

Despite the fact that the world has entered an era of new technological advances, the education system seems to be lagging behind (Cohen, 2011; Baker, et al., 2012; de Sousa Borges, et al., 2014; Dicheva, et al., 2015). There is therefore an urgent need for reforms and new challenges in contemporary adult education. The development of technology has also brought about the development of new technologically supported approaches in education. In this context, gamification presents a particularly novel and appealing approach. Gamification or game-based learning is a topical and relatively new concept which refers to the use of game elements in various real-world activities (Deterding, et al., 2011; Kim, 2015; Sardi, et al., 2017). The concept was mentioned by Nick Pelling as far back as 2002, but it was not before 2010 that the term entered general use. Gamification refers to a specific process of thinking through games and game mechanisms with the aim of actively engaging individuals in problem solving activities (Zichermann & Cunningham, 2011). Gamification is a powerful tool, as it attracts an individual's attention and also significantly affects one's behaviour and engagement in activities.

Gamification refers to the use of game elements (Khaleel, et al., 2016) which allow the user to perform the task more efficiently and make it more enjoyable (El-Hilly, et al., 2016). It incorporates game elements into non-game-related situations in order to improve student engagement and convey the relevant knowledge (Des Armier Jr., et al., 2016). The presence of technology in lesson plans has led to a shift from traditional lectures to interactive learning environments. These represent a platform for the development of the learning process by incorporating game elements which attract users' attention, increase their motivation to achieve goals, as well as promote competitiveness, effective teamwork, and improve interpersonal communication (Boskic & Hu, 2015).

Dicheva and colleagues (2015) find that the game elements most commonly used in the educational context are visual status, social engagement, freedom of choice, and quick feedback. To date, only a few studies have dealt with the principles of goals and personalisation. Subhash and Cudney (2018) find that the game elements most commonly used are points, badges, and leaderboards. Digital badges are a common element of educational games, and they also serve as an innovative approach to gamification in nursing, as they incorporate social interactions. As more advanced types of praise or evidence, digital badges serve to convey information on students' learning achievements, skills, and competences (White & Shellenbarger, 2018).

In adult education, gamification takes users back to their childhoods when they used games and play to learn and gain various skills. The tendency of being interested in innovation and actively adapting and building one's

skills and knowledge is not limited only to childhood, but forms an important part of human nature itself, which, in turn, promotes efficiency, perseverance and wellbeing throughout one's lifetime (Ryan & Deci, 2000; Lespiau & Tricot, 2019). Gamification can therefore serve as a tool for assessing one's cognitive (understanding, perception, cognition), socio-emotional (internal and external motivation, self-efficacy, ambition, social comparison) and psychomotor skills within different areas of nursing. Research (Banfield & Wilkerson, 2014; Morillas Barrio, et al, 2016; Dankbaar, 2017) shows that through the use of gamified education, one's intrinsic motivation develops more strongly than one's extrinsic motivation. Alsawaier (2018) also states that the use of gamification in the educational process could help motivate and engage students as it would contribute to changing their attitudes towards learning.

The use of gamification in education shows great potential as it improves its quality, cost-effectiveness, and flexibility (Gentry, et al., 2019). It also allows students to choose the time and pace of their own learning process (Brull & Finlayson, 2016). Numerous studies (Brull & Finlayson, 2016; Hamari, 2016; Sanchez, et al., 2020) report the use of gamification at all levels of the educational process (from elementary to university levels). Most students from the new generations now studying nursing (Skiba, et al., 2016) have grown up using completely different modern technology than previous generations (Sackmann & Winkler, 2013). In teaching these students new knowledge and skills, traditional approaches (e.g., lectures with the help of a PowerPoint presentation) are no longer sufficient (Boskic & Hu, 2015). Instead, the educational process aimed at younger generations must incorporate novel adult-learning approaches. Research shows (Simões, et al., 2013; Turan, et al., 2016) that students who use gamification show higher academic achievement than those who use traditional learning approaches. The same has also been reported for the field of nursing (Kinder & Kurz, 2018). Gamification creates a safe environment in which nursing students can engage in patient care without potential negative consequences for the patient. Cheong and colleagues (2014) find that students hold a positive attitude toward gamification.

In scientific research, the theoretical framework is of vital importance as it makes research work relevant and credible (Lederman & Lederman, 2015). As a philosophy of education, experiential education (i.e., the theory of experiential learning) represents the fundamental theoretical framework for gamification as an educational approach which connects one's cognitive, socio-emotional and psychomotor skills into a meaningful whole. The best results are achieved using two or more philosophies of education (Banfield & Wilkerson, 2014). Despite these technologically advanced times, contemporary traditional didactics are still rooted in "teacher-centred teaching", i.e. lectures during which students are required to sit,

listen and take notes, and which mostly take place without any personal interaction between the student and the teacher. On the other hand, the educational approach based on experiential education is exactly the opposite: students are placed at the centre of the educational process, which is therefore referred to as "student-centred teaching" (Balliu & Belshi, 2017). Possessing solid knowledge of the theories of learning allows the teacher to experiment and introduce various learning approaches, such as serious games and gamification-based learning (Uskov, et al., 2016). In theory, learning supported by gamification represents an approach aimed at changing user behaviour. This theory also emphasises that a change in user behaviour can occur when there is a quality connection between the lesson and its outcomes, and when the learning process is directly influenced. The goal of gamification in the learning process is not to replace lessons, but to supplement and improve them (Landers, 2014).

Conklin (2005) draws attention to the categorisation of educational objectives according to Bloom's taxonomy and its hierarchical structure, which encourages students to improve their cognitive skills and attain a higher-level of abstract knowledge with regard to specific learning objectives (Anderson, et al., 2009; Adams, 2015). Bloom's taxonomy comprises three domains: the cognitive, affective (emotional), and psychomotor domains (Bloom, 1956). Ben-Zvi (2010) proposes Bloom's taxonomy as a framework for evaluating the learning outcomes of the educational objectives achieved through experiential learning. In this context, the learning outcomes facilitate the assessment of the achieved educational objectives. Bloom's taxonomy is a model which can be used to report learning outcomes (Bloom, 1956). According to Alsawaier (2018), the inclusion of gamification in the learning process has a significant impact on student achievement. In addition to Bloom's taxonomy, some scholars also rely on other classifications of educational objectives, for example, the classification by Robert J. Marzan (Rutar Ilc, 2003). However, more research needs to be conducted to better understand the possibilities of integrating gamification into nursing curricula based on the selected taxonomy (Gallegos, et al., 2017).

According to our data, gamification as a more advanced approach in adult learning has not yet been included into any course units in the field of nursing in Slovenia. With this literature review of international research studies, our aim is to present the potential use of gamification in various course units in the field of nursing in Slovenia.

### *Aims and objectives*

The overall objective of this review article is to present gamification as a novel concept in the field of nursing education. The specific aims of this review article are as follows:

- to report the advantages and drawbacks of including gamification in the educational process in nursing;
- to present the effect of gamification on the cognitive, socio-emotional and psychomotor characteristics of nursing students;
- to assess the level of methodological quality of the studies which have applied gamification in the educational process in the field of nursing.

The research question was formulated on the basis of the PIOST guidelines (Population, Intervention, Output, Study, Time) (Polit & Beck, 2018) and reads: What is the impact of integrating gamification into nursing modules (I) on the cognitive, socio-emotional and psychomotor characteristics (O) of nursing students (P)? We included research articles in English (S) published after 2012 (T).

## **Method**

In the first stage of our study, we applied the descriptive research method and used search strings along with inclusion and exclusion criteria to compile the corpus of relevant literature. When creating the search string, we used the 2dSearch application for a better visualisation of search results, and the Publish or Perish (Version 7) and PubMed2XL (Version 2.01) applications for data retrieval. In the second stage of the study, the literature selected for further analysis was critically evaluated using the Mixed Methods Appraisal Tool (MMAT) tool, Version 8 (Hong, et al., 2018).

### *Review methods*

Literature screening was conducted in July 2019. We used the Google Scholar and Medline / PubMed search engines which provide free access, allowing for repeatability of this literature review, along with a sufficient number of databases (e.g., PubMed / Medline) for the topic searched. In the process of literature screening, we created a search string in English and included the Boolean operators AND and OR. The final search string was: ("elements of game" OR "game mechanics" OR "system design elements") AND ("nursing modules" OR "nursing education" OR "nursing teaching" OR "nursing courses"). We used the 2dSearch tool to create the search string for a better visualisation of the search hits.

To retrieve data from the Medline / PubMed search engine, we used the PubMed2XL application (Version 2.01) (Isaak, 2016), and the Publish or Perish application (Version 7) for the results from the Google Scholar search engine (Harzing, 2007, 2019). The spreadsheet database was created using MS Excel 2016. Following the initial filtering, two authors analysed all the search hits at three levels, namely by title, abstract and full text using the so-called *dummy* coding (Bech & Gyrð-Hansen, 2005), where "1" means that the hit qualifies for the next level, and "0" means

that the search hit is excluded at this level. The search hit, i.e., the study which received all three points in this screening, was included in the final analysis.

### Results of the review

Using the search string, we retrieved a total of 193 search hits (Medline / PubMed,  $n = 15$ ; Google Scholar,  $n = 178$ ). We included 9 search hits or studies in the final analysis (Figure 1). To show the impact factors (IF) of the research studies included, we used the Journal Citation Reports database from 2018, available on the Co-operative Online Bibliographic System and Services.

### Quality assessment of the review and the description of data processing

In the final step, three authors individually appraised the included studies using the MMAT tool, which had

already been used in review studies and had proven appropriate for appraising the methodological quality of research. In doing so, we followed the prescribed MMAT User Guide (Hong, et al., 2018). The MMAT tool comprises a total of 19 criteria for the appraisal of quantitative and qualitative research and mixed methods research, divided into five sets or criteria: the qualitative set, randomised controlled set, non-randomised set, observational descriptive set, and mixed methods set (Halcomb, 2019). While the calculation of the overall score is not recommended, it is, instead, advisable to present estimates for each individual criterion. In our case, we gamified the final results of the MMAT and incorporated game elements in the form of star(s) (a coloured star denoted that the criterion had been met; an uncoloured star denoted that the criterion had not been met; a half-coloured star denoted that the criterion could not be appraised). We used the Inkscape tool (version 0.92.4) to visualise the results.

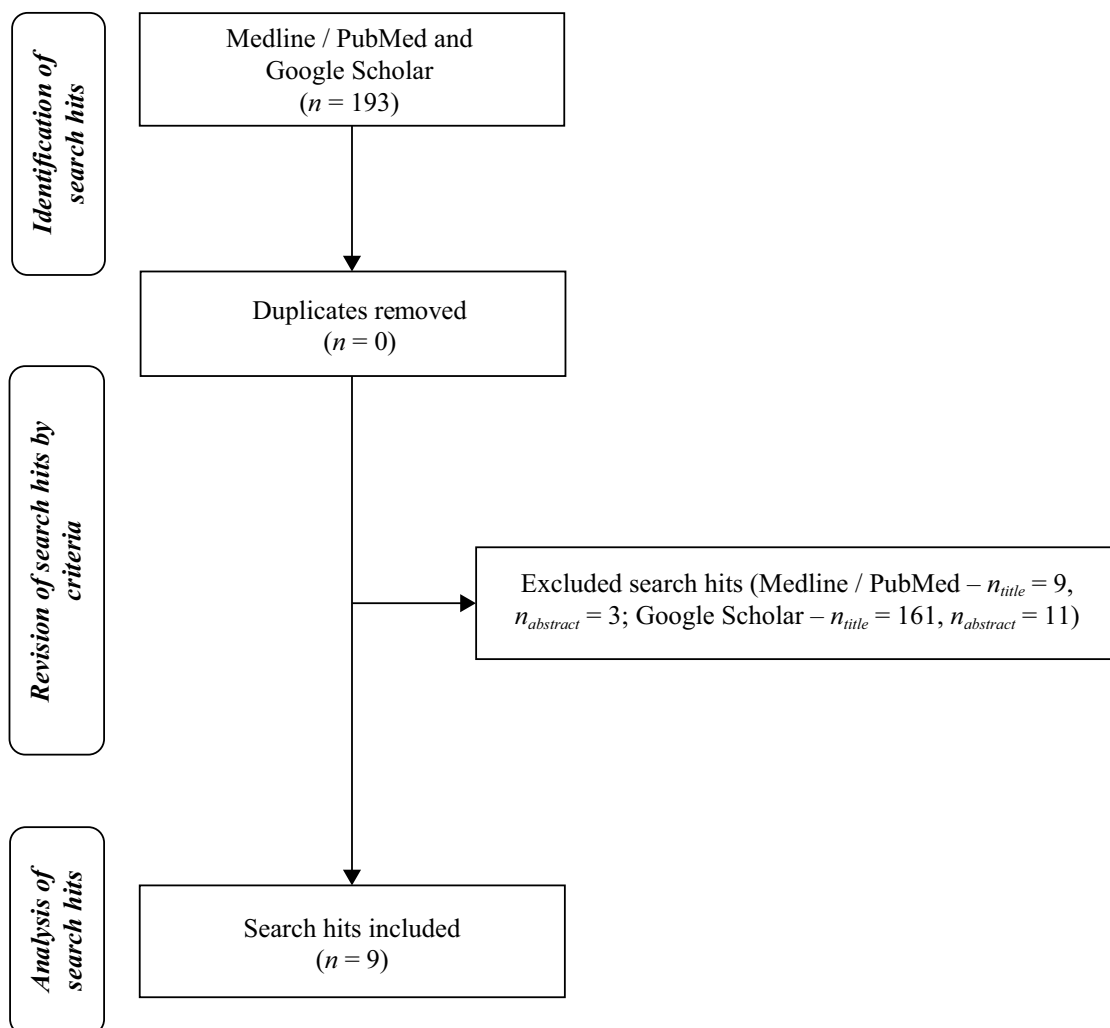


Figure 1: Flow diagram of the literature screening process

## Results

The research studies were most often co-authored by two authors and were cited an average of 8.56 times ( $s = 7.55$ ) per year. All studies were published in journals dealing with a variety of topics in the field of nursing. Six of the journals had an IF from the *Journal Citation Reports* categorisation. The article by Roche and colleagues (2018) was published in *Computers Informatics Nursing* (Wolters Kluwer Health, Inc.), which was the journal with the lowest IF (2018) = 1.029. The article by Davidson and Candy (2016) was published in *Worldviews on Evidence-Based Nursing* (Wiley Online Library) which was the journal with the highest IF (2018) = 2.500 (Table 1).

The research studies were conducted within different educational modules of nursing degree programmes. The common objective in all these studies was to examine the applicability of gamification and to demonstrate its impact on nursing students. The results show that the positive impact of gamification in nursing students is expressed in the form of motivation, engagement, interest, learning and knowledge, while the negative impact of gamification manifests itself in the form of inefficiency and inappropriateness of game-based learning and lack of student commitment. Four studies specifically mention the underlying methodology in the form of the theories of learning: Bloom's taxonomy ( $n = 1$ ), the ARCS model (the attention, relevance, confidence, and satisfaction model of motivation) (Keller, 1987) ( $n = 1$ ) and simulation-based learning (Cato, 2012) ( $n = 2$ ) (Table 2).

Table 2 also shows the most frequently included game elements in nursing education, such as badges ( $n = 7$ , 77.78 %), feedback ( $n = 5$ , 55.56 %), and point systems with leaderboards ( $n = 4$ , 44.44 %). The frequency of inclusion of each game element in the research studies analysed is also shown in Figure 2 (a).

As shown in Figure 2 (b), over half of the studies ( $n = 7$ , 77.78 %) included several game elements at the same time.

Out of the eight studies which mentioned the use of badges, commendations, or badges and commendations (Figure 2, a – vertical lines), only two studies implemented badges and / or commendations as the only game element (Figure 2, b – vertical lines only). A total of six studies also included other game elements in addition to badges and/or commendations: in two studies, these were point systems or leaderboards (Figure 2, b – intersection of fields with vertical and wavy lines); in one study, these were challenges and / or feedback (Figure 2, b – intersection of fields with vertical lines and dots); in three of the studies, these were both point systems or leaderboards and challenges and / or feedback (Figure 2, b – intersection of fields with vertical and wavy lines and dots at the centre). One study, which included game elements of all three groups (badges and / or commendations, point systems or leaderboards, and challenges and / or feedback), also included the social impact (Figure 2, b – intersection of the fields with vertical lines, wavy lines and dots and the circle, without a pattern at the centre). Game elements were most often expressed through virtual (e.g., digital learning environment in the form of games, quizzes, forums, etc.) and simulation (e.g., puppets and games) environment.

Most of the articles reviewed applied a mixed methods approach ( $n = 5$ ). Following the initial MMAT review, all of the studies included were eligible for further MMAT appraisal, as they address two research questions on average. The main appraisal of the studies showed the average level of quality of the included methodologies according to the MMAT. The study conducted by Foli and colleagues (2016), which is based on a mixed methods approach, achieved the highest score by individual criteria (five stars) and

**Table 1:** Basic characteristics of included research

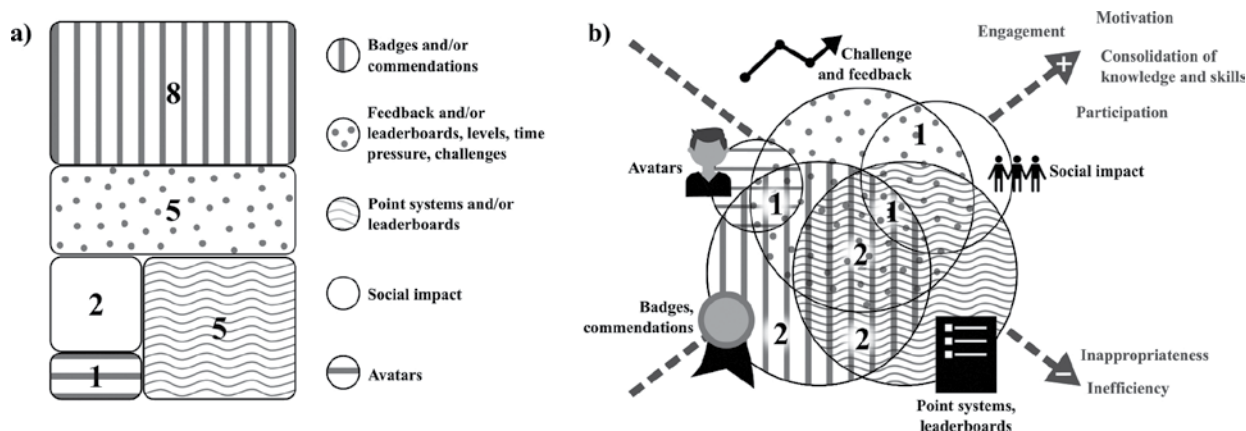
No.	Authors, year of publication (country)	Number of authors	Journal	Impact factor (2018)	Citation
1	Castro & Gonçalves, 2018 (Brazil)	2	Revista brasileira de enfermagem	/	1
2	Chia, 2013 (Singapore)	1	Singapore Nursing Journal	/	16
3	Davidson & Candy, 2016 (Canada)	2	Worldviews on Evidence-Based Nursing	2.500	20
4	Foli, et al., 2016 (India)	3	The Journal of Nursing Education	/	10
5	Gallegos, et al., 2017 (USA)	4	Nurse Education in Practice	1.665	7
6	Garnett & Button, 2018 (Australia)	2	Nurse Educator	1.262	4
7	Mackavey & Cron, 2019 (USA)	2	Nurse Education Today	2.442	0
8	Mawhirter & Garofalo, 2016 (USA)	2	Clinical Simulation in Nursing	2.286	17
9	Roche, et. al., 2018 (USA)	6	Computers Informatics Nursing	1.029	2

Legend: No. – number; USA – United States of America

**Table 2:** *Content characteristics of included research*

No.	Research objectives	Methodology	Game elements	Main findings
1	To analyse the impact of gamification on the development of competencies in the Informatics in Nursing course and examine the perception of gamification by nursing students and teachers.	Sample: 10 nursing students and 5 teachers. Assessment environment: digital learning environment with gamification and e-mail address. Data analysis: descriptive statistics and content analysis (comments).	Feedback, social impact, point system, ranking, levels, leaderboard.	The study reports a successful integration of gamification into the Informatics in Nursing course and a subsequent greater engagement and motivation in nursing students.
2	To analyse game-based learning on the topic of pulmonary disease within a simulated environment and to examine its impact on student perception and experience.	Theory: simulation-based learning Sample: 151 nursing students. Assessment environment: open and closed question survey Data analysis: descriptive statistics and comments.	Levels, avatars, feedback, badges (trophies), challenge (quiz).	The integration of game elements into the simulated environment helps consolidate the knowledge and practical skills of nursing students and makes learning more enjoyable.
3	To analyse game-based learning on evidence-based practice, and examine its impact on the development of nursing students' knowledge and skills.	Theory: Bloom's taxonomy. Sample: 30 nursing students. Assessment environment: educational game with gamification and a questionnaire. Data analysis: descriptive statistics and content analysis (comments).	Point system, leaderboard, badges, commendations (awards).	The new method of learning was positively accepted by nursing students and was expressed in the appropriate level of engagement, raised level of motivation and progress in the acquisition of knowledge.
4	To obtain opinions and assessments of the impact of badges on motivation in the educational process of nursing students related to safety and quality of nursing.	Theory: the ARCS model. Sample: 87 nursing students. Assessment environment: digital learning environment and questionnaire. Data analysis: descriptive statistics and content analysis.	Badges.	Most nursing students believe that incorporating game elements is reasonable and that they have a positive effect on learning motivation.
5	To describe the experiences of nursing students in nursing education based on educational play and gamification.	Theory: simulation-based learning Sample: 57 nursing students. Assessment environment: educational game with gamification. Data analysis: thematic analysis (comments).	Badges, point system, leaderboard, commendation.	Most nursing students expressed the inappropriateness and ineffectiveness of gamification with regard to the course topic.
6	To investigate the motivational impact of gamification in nursing students on the topic of foundational bioscience.	Sample: 408 (in 2015), 420 (in 2016) and 418 (in 2017) nursing students. Assessment environment: digital learning environment. Data analysis: descriptive statistics.	Badges.	Learning through gamification using the digital badge system motivates nursing students to learn, increases their level of engagement, as well as their interest in acquiring new knowledge.
7	To assess the impact of innovative education on the learning outcomes and engagement of nursing students in the family nurse practitioner programme.	Sample: 522 nursing students over eight semesters. Assessment environment: digital learning environment. Data analysis: a complex quantitative data analysis.	Feedback, social impact, challenges.	Gamification showed an effect on student engagement and learning effectiveness.
8	To encourage education and preparedness of nursing students for the clinical environment and to strengthen mutual cooperation.	Sample: 7 first semester nursing students, and 11 fourth semester nursing students. Assessment environment: patient simulator and questionnaire. Data analysis: descriptive statistics and thematic analysis (self-evaluation).	Feedback, rating scale, point system, time pressure, challenges, praise (certificate).	All nursing students expressed the opinion that the learning experience was useful, interesting and that it reduced their fear of the unexpected. Nursing students reported greater preparedness for the clinical environment.
9	To increase engagement and improve the education of nursing students through gamification.	Sample: 133 (in 2015) and 121 (in 2016) nursing students. Assessment environment: educational game and questionnaire. Data analysis: a complex quantitative data analysis.	Badges, feedback, leaderboards, point system.	The use of gamification was positively evaluated by nursing students. They improved their learning outcomes in nursing education.

Legend: No. – number; ARCS – attention, relevance, confidence, and satisfaction model of motivation



**Figure 2:** Frequency of included game elements (2a) and simultaneous use of game elements with positive and negative effects (2b)

**Table 3:** Quality score in research with game elements (stars)

No.	Type of research	Number of RQ	Evaluation of the quality of research according to individual criteria	Overall average quality of research
1	Mixed-methods research	1	☆☆☆☆☆	3
2	Mixed-methods research	1	★★★★☆	2
3	Mixed-methods research	2	★★★★☆	4
4	Mixed-methods research	3	★★★★★	4.5
5	Qualitative research	1	★★★★☆	3
6	Quantitative research	5	★★★★★	3.4
7	Mixed-methods research	2	★★★☆☆	3
8	Quantitative research	1	★★★★☆	2.5
9	Quantitative research	2	★★★★☆	3.5

Legend: No. - number; RQ - research question

the highest overall average score of methodological quality (4.5 out of 5 points) according to the MMAT criteria (Table 3).

## Discussion

We performed a search, analysis and synthesis of professional and scientific literature in the field of integrating gamification into nursing curricula. Of the 9 studies included, a total of 8 reported or advocated the positive impact of gamification in the learning process of nursing education. Our results are similar to those obtained by other systematic reviews (Mora, et al., 2017; Subhash & Cudney, 2018) in the field of gamification in that they reported the inclusion of similar game elements, such as badges, points and feedback, and concluded that they are suitable for integration into higher education. Game elements have a positive effect mainly on increasing motivation (Moritz, 2017; Castro & Gonçalves, 2018; Garnett

& Button, 2018; White & Shellenbarger, 2018) and interest (Garnett & Button, 2018). They also contribute to preparedness for the clinical environment (Chia, 2013; Garnett & Button, 2018), reduce the fear of the unexpected (Garnett & Button, 2018) and contribute to greater engagement (Moritz, 2017; Castro & Gonçalves, 2018). In most cases, students find the inclusion of gamification in the learning process interesting, as they feel it contributes to an enhanced learning experience (Kurz & Kinder, 2017; Roche, et al., 2017; Mackavey & Cron, 2019). Conversely, Gallegos (2017) finds that gamification can also negatively affect the experience and satisfaction of nursing students. A similar finding was also reached by Fan and colleagues (2015). In their research, students found teaching through giving examples as more appropriate. Numerous studies have shown that students have a positive attitude towards the use of gamification in learning (Boeker, et al., 2013; Nevin, et al., 2013; Buckley & Doyle, 2014; Woo, 2014; Urh

et al., 2015), while very little research has focused on faculties and teachers (Hung, et al., 2017). Teachers have a great influence on the motivation of students, which is why it is important for them to use modern, novel and innovative technologies in the learning process and thus attract students' attention. Teachers were also found to report positive experiences with the novel learning approaches using gamification (Brom, et al., 2009; Noraddin, 2015; Kopcha, et al., 2016; Alabbasi, 2018). Teachers are aware of the need to motivate students and to integrate new approaches into conventional learning environments (Noraddin, 2015). Alabbasi (2018) collected data from teachers involved in a postgraduate teaching programme on the use of gamification in online learning. While the results of this study show a positive perception regarding the use of gamification, some believe it can negatively affect students. In recent years, since gamification has become part of education, most research studies have reported positive results related to its inclusion in the learning process. Toda and colleagues (2018) focused their research interest primarily on the negative effects of gamification on students. On the basis of a systematic cartographic research, they identify four negative effects, namely: loss of efficiency, loss of engagement, unwanted behaviour, and declining effects. Among the negative effects most commonly mentioned is the loss of effectiveness resulting from tasks and situations in which gamification hinders or harms students' learning process. Other studies (De-Marcos, et al., 2014; Naik & Kamat, 2015) report on the loss of achievement, which some perceive as a consequence of the presence of demotivating effects (Barata, et al., 2013; Hanus & Fox, 2014; Attali & Ariev-Attali, 2015). On the basis of their analysis, Toda and colleagues (2018) found that the negative effects occurred mainly due to the lack of appropriate methodologies or frameworks for planning and introducing the role into the learning context (Faiella & Ricciardi, 2015), which was also shown through the MMAT assessment of the quality of methodologies used in the analysed studies. According to MMAT, the results of our literature review show the most common limitations: non-inclusion of taxonomies and learning theories, poorer connections between individual methodologies, deficient qualitative or quantitative data analyses, various discrepancies in data interpretation and poorly designed discussions according to the chosen methodology.

The examined studies also show that gamification integrates well into courses such as informatics (Castro & Gonçalves, 2018), pharmacy (Sera & Wheeler, 2017) and anatomy in nursing (Roche, et al., 2018), i.e., into courses in which the teaching material is based more on quantitative rather than qualitative data. Our results show that, according to MMAT, the highest quality assessment was obtained by studies (Foli, et al., 2016) which include both types of data.

Furthermore, we note that gamification cannot be included in every course unit in the field of nursing, and teachers must be very careful in introducing it as the main or complementary teaching method, and choose a proven technologically advanced assessment environment. A telling comparison is the use of gamification in the form of the Rezzly simulation game, for which research by Gallegos and colleagues (2017) reported negative feedback by students who described it as inappropriate and inefficient in learning theoretical nursing. The study conducted by Moritz (2017), however, reports a positive attitude of students towards gamification, as efficiency in learning the topics of clinical nursing increased through the use of the Rezzly simulation game.

Gamification has recently assumed an important role in education within various areas of nursing. Nevertheless, the traditional method of teaching remains at the forefront, as it represents one of the simpler and more easily accessible forms of education. Some of the many reasons for this are the focus of the educational and research institution (i.e., research and development, purchasing newer simulation and educational equipment, etc.), teachers' personal traits (enthusiasm for innovation, age, staying up to date, accuracy, computer literacy, time barrier, etc.) and the lag in overall technological development (ranging from the inefficiency of commercial game-based products to the lack of credible research in this field). In addition to being willing to integrate information and communication technologies and gamification into their work, teachers should also be offered prior training and specialised support for counselling work and solving potential technical and operational problems (Castro & Gonçalves, 2018). Moreover, teachers are often reluctant to try new learning approaches for fear of wasting time and obtaining lower scores in student assessment (Royse & Newton, 2007; Roche, et al., 2018). As a result, more research should be invested into exploring the possibilities of implementing this concept, testing the acceptance of gamification by teachers and students, and the level of motivation and performance of students who using game elements in specific nursing course units.

The aim of this literature review was to gain insight into the use of gamification in the field of education in nursing and to gauge the possibilities of its transfer into the Slovene environment. Despite the many benefits of this literature review, there are also certain limitations to our study. While we did perform a literature review, we did not conduct the entire process of a systematic search, analysis and synthesis of the literature. As a result, there is a possibility that not all articles related to gamification in the educational process within nursing were included in the review. Nevertheless, the number of articles we based this study on was similar to those reviewed in the already published 2020 study by Noyes and colleagues (2020), which focuses on a



systematic analysis of the impact of digital badges in the process of health education. In the future, it would be interesting to conduct a systematic literature review in the field of gamification in the educational process of nursing and an in-depth analysis of the findings.

## Conclusion

Gamification is a fairly new concept in nursing education. It challenges teachers to make teaching more interesting and engaging. The studies conducted to date have been carried out abroad, which is why the findings should be interpreted with caution and the new method of gamification should also be tested before its implementation into the Slovene educational environment. Most studies report positive effects of gamification applied in the educational process in the field of nursing, manifested in the form of increased motivation and active participation of nursing students. On the other hand, the negative effect of gamification should not be disregarded, as, if not appropriately applied, the approach may result in student inefficiency and lack of commitment. Since gamification in terms of a regular advanced form of education has not yet been officially integrated in either international or Slovene nursing curricula, it presents a challenge for both researchers and teachers.

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*Slovenian translation / Prevod v slovenščino*

## Uvod

Svet je vstopil v ero novih tehnoloških dosežkov, medtem ko je izobraževalni sistem obtičal v preteklosti (Cohen, 2011; Baker, et al., 2012; de Sousa Borges, et al., 2014; Dicheva, et al., 2015). Sodobna andragogika se mora zato soočiti z novimi reformami in izzivi. Z razvojem tehnologije so se – še posebej v tujini – razvili tudi novi tehnološko podprti pristopi v izobraževalnem sistemu. Nov in atraktiven pristop predstavlja igrifikacija (ang. *gamification*). Gre za učenje, ki temelji na igri, ter aktualen in precej nov koncept, ki se nanaša na uporabo elementov igre v številnih dejavnostih v resničnem svetu (Deterding, et al., 2011; Kim, 2015; Sardi, et al., 2017). Koncept je že leta 2002 omenil Nick Pelling, vendar se je širša uporaba začela komaj po letu 2010. Igrifikacija je proces razmišljanja s pomočjo iger in mehanizmov iger z namenom aktivnega vključevanja posameznikov ter reševanja problemov (Zichermann & Cunningham, 2011). Igrifikacija je močno orodje, saj pomembno vpliva na pridobivanje posameznikove pozornosti, njegovo vedenje in vključevanje v določene aktivnosti.

Igrifikacija se nanaša na uporabo elementov iger (Khaleel, et al., 2016), ki uporabniku omogočajo, da opravi nalogo učinkoviteje in je ta zanj prijetnejša (El-Hilly, et al., 2016). Elemente iger vključujejo v

situacije, ki niso povezane z igrami, da bi izboljšali sodelovanje študentov in dosegli zeleno vedenje (Des Armier Jr., et al., 2016). Prisotnost tehnologije v učnih enotah je navdihnila premik od tradicionalnih predavanj k interaktivnim učnim okoljem. Slednja predstavljajo priložnost za razvoj učnega procesa z vključevanjem elementov iger, ki pritegnejo pozornost uporabnikov, zvišajo motivacijo za doseganje ciljev ter spodbujajo konkurenčnost, učinkovito timsko delo in medsebojno komunikacijo (Boskic & Hu, 2015).

Dicheva in sodelavci (2015) ugotavljajo, da so v izobraževalnem kontekstu najpogosteje uporabljeni elementi iger vizualni status, družbena angažiranost, svoboda izbire in hitre povratne informacije. Redki dokumenti so obravnavali načela ciljev in personalizacije. Subhash in Cudney (2018) ugotavljata, da so najpogosteje uporabljeni elementi iger točke, značke in lestvice. V izobraževanju se kot elementi igre pogosto uporabljajo digitalne značke, ki prav tako služijo kot inovativen pristop k igrifikaciji zdravstvene nege z vključevanjem socialnih povezav. Kot naprednejše vrste pohval oziroma dokazil izražajo informacije o učni uspešnosti, dosežkih, spretnostih in kompetencah študentov (White & Shellenbarger, 2018).

Igrifikacija v andragoškem izobraževanju uporabnike popelje v otroško dobo, v kateri so skozi igro spoznavali in usvajali različne veščine. Nagnjenost k zanimanju za novosti ter dejavno prilagajanje in oblikovanje lastnih sposobnosti ter znanja niso omejeni le na otroštvo, temveč gre za pomembno značilnost človeške narave, ki vpliva na učinkovitost, vztrajnost in dobro počutje skozi vsa življenjska obdobja (Ryan & Deci, 2000; Lespiau & Tricot, 2019). Z igrifikacijo lahko preverjamo kognitivne (razumevanje, zaznavanje, spoznavanje), socialno-emocionalne (notranja in zunanja motivacija, samoučinkovitost, ambicioznost, socialno primerjanje) in psihomotorične veščine v različnih spektrih zdravstvene nege. Raziskave (Banfield & Wilkerson, 2014; Morillas Barrio, et al., 2016; Dankbaar, 2017) so pokazale, da se pri izobraževanju z igrifikacijo pri posameznikih močneje kot zunanja (ekstrinzična) razvija notranja (intrinzična) motivacija. Tudi Alsawaier (2018) navaja, da bi lahko uporaba igrifikacije v izobraževalnem procesu pomagala pri motivaciji in zavzetosti študentov, saj bi prispevala k spreminjanju njihovega stališča do učenja.

Igrifikacija v izobraževalnem procesu lahko prispeva k izboljšanju kakovosti, stroškovni učinkovitosti in fleksibilnosti (Gentry, et al., 2019). Prav tako študentom omogoča, da sami izberejo čas in hitrost učenja (Brull & Finlayson, 2016). Številne raziskave (Brull & Finlayson, 2016; Hamari, 2016; Sanchez, et al., 2020) opisujejo uporabo igrifikacije na vseh ravneh izobraževanja (od osnovnošolske do univerzitetne ravni). V izobraževalni sistem zdravstvene nege vstopajo nove generacije študentov

(Skiba, et al., 2016), ki so večinoma odraščale s popolnoma drugačno sodobno tehnologijo kot prejšnje generacije (Sackmann & Winkler, 2013). Tako jim ne zadošča posredovanje znanj in veščin s tradicionalnim pristopom (npr. predavanja s pomočjo *PowerPoint* predstavitev) (Boskic & Hu, 2015). Zato je treba v učne enote za mlajše generacije uvesti novejšo andragoške pristope. Raziskave (Simões, et al., 2013; Turan, et al., 2016) so pokazale, da dosežajo študenti, ki uporabljajo igrifikacijo, boljše akademske uspehe kot tisti, ki uporabljajo tradicionalne pristope učenja. Enako je bilo ugotovljeno na področju zdravstvene nege (Kinder & Kurz, 2018). Igrifikacija ustvarja varno okolje, kjer lahko študenti zdravstvene nege izvajajo intervencije brez možnih negativnih posledic za pacienta. Cheong in sodelavci (2014) ugotavljajo, da imajo študenti do igrifikacije pozitiven odnos.

V znanstvenoraziskovalnih krogih ima teoretični okvir velik pomen in brez njega je raziskovalno delo manj relevantno ter kredibilno (Lederman & Lederman, 2015). Izkusveno izobraževanje (t. i. teorija izkusvenega učenja) predstavlja kot filozofija izobraževanja temeljni teoretični okvir igrifikacije – izobraževalnega pristopa, ki povezuje kognitivne, socialno-emocionalne in psihomotorične veščine v smiselno celoto. Najboljše rezultate dosežemo z uporabo dveh ali več filozofij izobraževanja (Banfield & Wilkerson, 2014). Trenutna tradicionalna didaktika kljub naprednejšemu času še vedno temelji na »izobraževanju, usmerjenem k učitelju«, med katerim študenti sedijo, poslušajo in zapisujejo predavanje, zaključki pa se večinoma brez osebne interakcije med študentom in učiteljem. Izobraževalni pristop, ki temelji na izkusvenem izobraževanju, pa je ravno obraten: študenti so v centru izobraževalnega sistema, gre za »izobraževanje, usmerjeno k študentu« (Balliu & Belshi, 2017). Dobro poznavanje teorij učenja učitelju omogoča eksperimentiranje in vpeljava različnih učnih pristopov, kot je npr. izobraževanje, ki temelji na igrifikaciji in resnih igrar (ang. *serious games and gamification based learning*) (Uskov, et al., 2016). V teoriji učenje, podprto z igrifikacijo, predstavlja pristop, usmerjen k spreminjanju vedenja uporabnikov. Teorija prav tako poudarja, da lahko do spremembe vedenja pri uporabnikih pride, kadar obstaja kakovostna povezava med poukom in rezultati ter kadar neposredno vplivamo na učenje. Cilj igrifikacije v učnem procesu ni nadomestitev pouka, temveč njegova dopolnitev in izboljšanje (Landers, 2014).

Conklin (2005) opozarja na kategorizacijo vzgojno-izobraževalnih ciljev po Bloomovi taksonomiji in na njeno hierarhično strukturo urejanja učnih ciljev poučevanja, kar študente spodbudi k izboljšanju njihovega mišljenja in višji ravni abstraktnega znanja, upoštevajoč opredeljene učne cilje (Anderson, et al., 2009; Adams, 2015). Bloomova taksonomija vsebuje tri domene: kognitivno (poznavanje), afektivno

(čustveno) in psihomotorično domeno (Bloom, 1956). Ben-Zvi (2010) predlaga Bloomovo taksonomijo kot okvir ocenjevanja rezultatov doseženih učnih ciljev izkusvenega učenja. S tem so tesno povezani tudi učni izidi, saj nam omogočajo ocenjevanje doseženih učnih ciljev. Bloomova taksonomija je model, ki se lahko uporabi za pisanje učnih rezultatov (Bloom, 1956). Kot ugotavlja Alsawaier (2018), vključevanje igrifikacije v proces učenja pomembno vpliva na študentov dosežek. Poleg Bloomove taksonomije se nekateri opirajo tudi na druge klasifikacije učnih ciljev, kot je na primer klasifikacija po Robertu J. Marzanu (Rutar Ilc, 2003). Da bi bolje razumeli možnosti vključevanja igrifikacije v učne načrte študijskih predmetov s področja zdravstvene nege, ki temeljijo na izbrani taksonomiji, bi bilo treba izvesti še več raziskav (Gallegos, et al., 2017).

Po nam znanih podatkih igrifikacija kot naprednejši andragoški pristop še ni bila vključena v nobeno izmed učnih enot s področja zdravstvene nege v slovenskem prostoru. S tem pregledom literature želimo na podlagi tujih raziskav prikazati potencialno uporabo igrifikacije v različnih učnih enotah s področja zdravstvene nege v slovenskem prostoru.

### *Namen in cilji*

Namen preglednega članka je predstaviti igrifikacijo kot nov koncept na področju izobraževanja v zdravstveni negi.

Cilji preglednega članka so:

- prikazati pozitivne in negativne strani igrifikacije pri vključevanju v izobraževalni proces zdravstvene nege;
- prikazati vpliv igrifikacije na kognitivne, socialno-emocionalne in psihomotorične lastnosti študentov zdravstvene nege;
- oceniti stopnjo metodološke kakovosti raziskav, ki so uporabljale igrifikacijo v izobraževalnem procesu na področju zdravstvene nege.

Raziskovalno vprašanje je bilo oblikovano na podlagi PIOST-priporočila (ang. *Population, Intervention, Output, Study, Time*) (Polit & Beck, 2018) in se glasi: Kakšen vpliv ima vključevanje igrifikacije v učne enote zdravstvene nege (I) na kognitivne, socialno-emocionalne in psihomotorične lastnosti (O) študentov zdravstvene nege (P)? Vključili smo raziskave v angleškem jeziku (S), objavljene po letu 2012 (T).

### **Metode**

V prvem delu smo uporabili deskriptivno raziskovalno metodo dela in s pomočjo iskalnih nizov ter vključitvenih in izključitvenih kriterijev poiskali ustrezno literaturo. Pri ustvarjanju iskalnega niza smo za boljšo vizualizacijo zadetkov uporabili aplikacijo

2dSearch, za pridobivanje podatkov pa aplikaciji Publish or Perish (verzija 7) in PubMed2XL (verzija 2.01). V drugem delu smo literaturo, vključeno v nadaljnjo analizo, kritično ocenili z orodjem MMAT (Mixed Methods Appraisal Tool), verzija 8 (Hong, et al., 2018).

### Metode pregleda

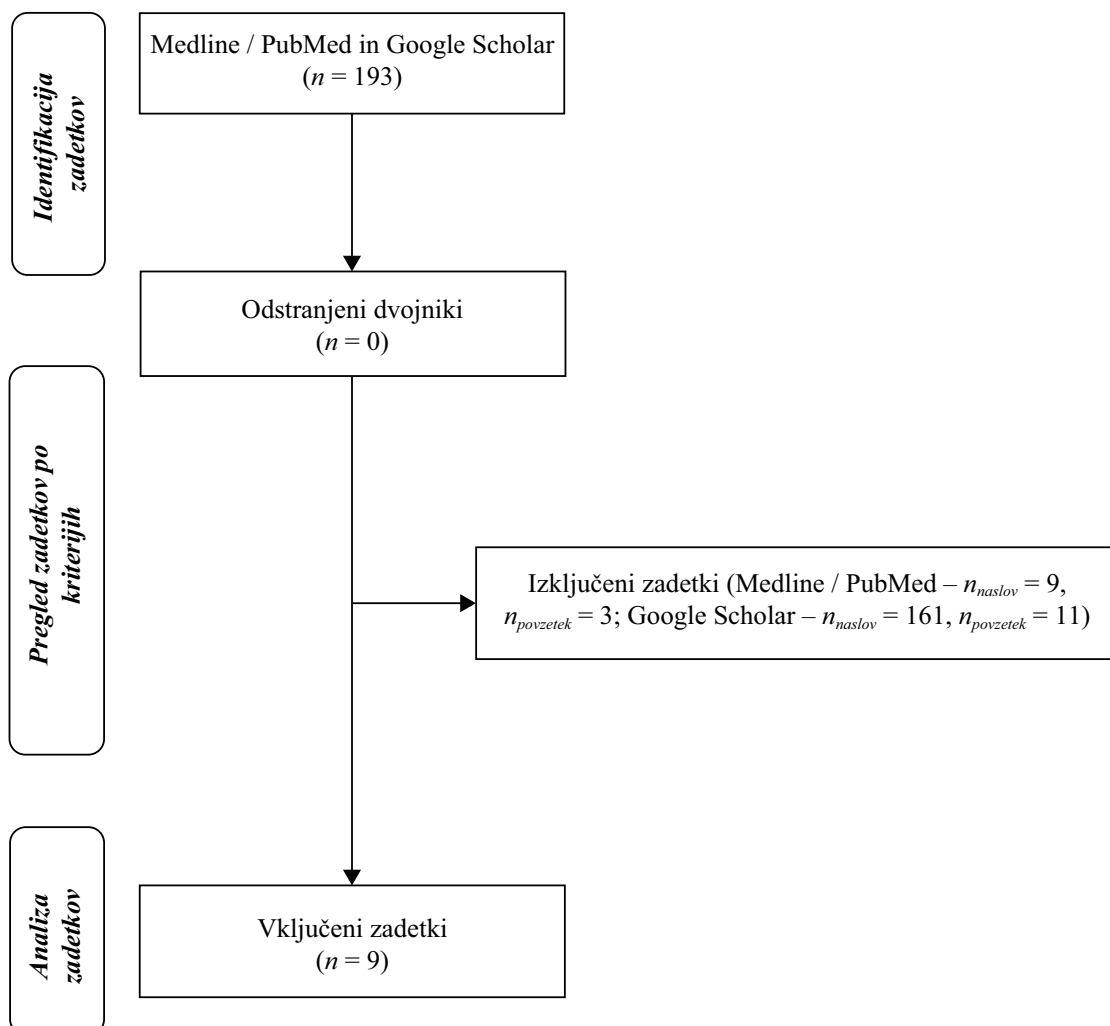
Pregled literature je bil izveden v juliju 2019. Uporabili smo Google Scholar in Medline / PubMed iskalnika zaradi brezplačnega dostopa, kar omogoča ponovljivost našega pregleda literature in zadostno število podatkovnih baz (npr. PubMed / Medline) za iskano tematiko. Pri iskanju literature smo ustvarili iskalni niz v angleškem jeziku in vključili Boolova operaterja AND (IN) ter OR (ALI). Končni iskalni niz se je glasil: (»elements of game« OR »game mechanics« OR »system design elements«) AND (»nursing modules« OR »nursing education« OR »nursing teaching« OR »nursing courses«). Pri ustvarjanju

iskalnega niza smo si pomagali z orodjem 2dSearch za lažjo vizualizacijo zadetkov.

Za pridobivanje podatkov iz Medline / PubMed iskalnika smo uporabili aplikacijo PubMed2XL (verzija 2.01) (Isaak, 2016), za zadetke iz iskalnika Google Scholar pa aplikacijo Publish or Perish (verzija 7) (Harzing, 2007, 2019). Tabelarično zbirko podatkov smo ustvarili s pomočjo orodja MS Excel 2016. Vse zadetke sta dva avtorja po začetnem filtriranju analizirala v treh nivojih, in sicer po naslovu, povzetku in celotnem besedilu s t. i. *dummy* kodiranjem (Bech & Gyrd-Hansen, 2005), pri čemer »1« pomeni, da gre za zadek v naslednji nivo; »0« pa, da je zadek v tem nivoju izpadel. Zadek oziroma raziskava, ki je ob zaključku ocenjevanja prejela vse tri točke, je bila vključena v končno analizo.

### Rezultati pregleda

S pomočjo iskalnega niza smo skupaj dobili 193 zadetkov (Medline / PubMed,  $n = 15$ ; Google Scholar,



Slika 1: Diagram poteka iskanja literature

$n = 178$ ). V končno analizo smo vključili 9 zadetkov oziroma raziskav (Slika 1). Za prikaz faktorjev vpliva (FV) vključenih raziskav smo uporabili faktografsko bazo podatkov Journal Citation Reports iz leta 2018, dostopno na Kooperativnem online bibliografskem sistemu in servisu.

### Ocena kakovosti pregleda in opis obdelave podatkov

V zadnjem koraku so trije avtorji posamično ocenili vključene raziskave z orodjem MMAT, ki je bilo že uporabljeno v preglednih raziskavah in se je izkazalo kot primerno orodje za ocenjevanje metodološke kakovosti raziskav. Pri tem smo upoštevali predpisana MMAT-navodila (Hong, et al., 2018). Orodje MMAT vsebuje 19 kriterijev za oceno kvantitativnih in kvalitativnih raziskav ter raziskav mešanih metod, ki so razdeljeni v pet sklopov oziroma kriterijev: kvalitativni sklop, randomizirani kontrolirani sklop, nerandomizirani sklop, opazovalni opisni sklop in sklop mešanih metod (Halcomb, 2019). Izračun končne ocene se odsvetuje. Namesto tega se priporoča predstavitev ocen za vsak posamezni kriterij. V našem primeru smo končne rezultate po orodju MMAT igrificirali in elemente iger vključili v obliki zvezdic (obarvana zvezdica pomeni, da je kriterij dosežen; neobarvana zvezdica pomeni, da kriterij ni dosežen; polovično obarvana zvezdica pomeni, da kriterija nismo mogli oceniti). Za vizualizacijo rezultatov smo uporabili orodje Inkscape (verzija 0.92.4).

## Rezultati

Raziskave so najpogosteje nastale v sodelovanju dveh avtorjev in so bile v povprečju citirane 8,56-krat

( $s = 7,55$ ) letno. Vse raziskave so bile objavljene v revijah, ki obravnavajo različne tematike zdravstvene nege. Šest revij ima FV iz kategorizacije *Journal Citation Reports*. Članek Rocheja in sodelavcev (2018) je bil objavljen v reviji *Computers Informatics Nursing* (Wolters Kluwer Health, Inc.), ki je imela izmed vseh najnižji FV (2018) = 1.029. Članek Davidsona in Candyja (2016) je bil objavljen v reviji *Worldviews on Evidence-Based Nursing* (Wiley Online Library) z najvišjim FV (2018) = 2.500 (Tabela 1).

Analizirane raziskave so bile izvedene v različnih učnih enotah študijskih programov s področja zdravstvene nege. Njihov skupni cilj je bil preučiti uporabnost igrifikacije in prikazati njen vpliv na študente zdravstvene nege. Rezultati prikazujejo pozitiven vpliv igrifikacije na študente zdravstvene nege, ki se izraža v motivaciji, sodelovanju, zanimanju, učenju in vedenju, ter negativen vpliv igrifikacije v obliki neučinkovitosti, neprimernosti in nezavzetosti. Štiri raziskave posebej navajajo vključeno metodologijo v obliki teorij učenja: Bloomovo taksonomijo (ang. *Bloom taxonomy*) (Bloom, 1956) ( $n = 1$ ), model ARCS (ang. *The attention, relevance, confidence, and satisfaction model of motivation*) (Keller, 1987) ( $n = 1$ ) in izobraževanje, temelječe na simulacijah (ang. *Simulation-based learning*) (Cato, 2012) ( $n = 2$ ) (Tabela 2).

Iz Tabele 2 lahko razberemo tudi najpogosteje vključene elemente iger v izobraževanje študentov zdravstvene nege, kot so značke ( $n = 7$ , 77,78 %), povratne informacije ( $n = 5$ , 55,56 %) in točkovni sistemi z lestvicami ( $n = 4$ , 44,44 %). Pogostost vključevanja posameznega elementa iger v analiziranih raziskavah je prikazana tudi na Sliki 2 (a). Pri več kot polovici raziskav ( $n = 7$ , 77,78 %) je bilo

**Tabela 1:** Osnovne značilnosti vključenih raziskav

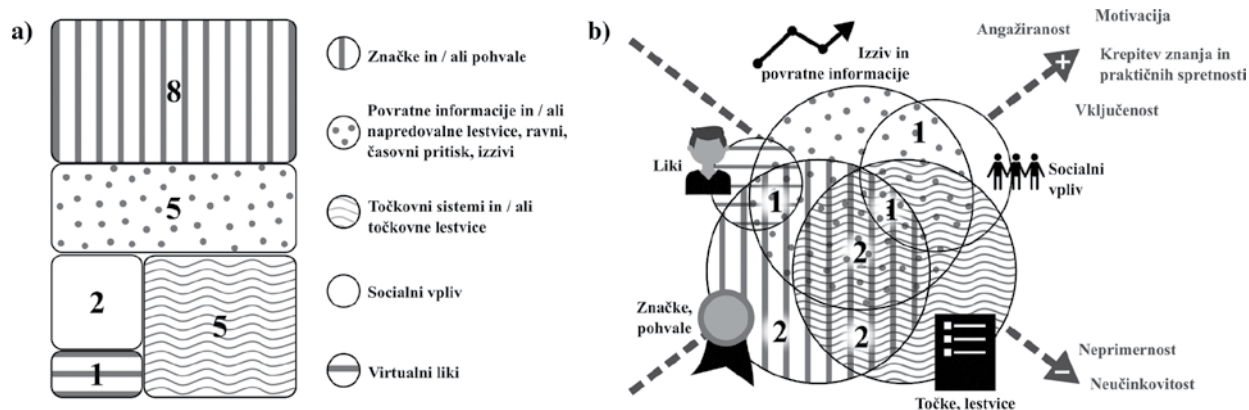
Št.	Avtorji, leto objave (država)	Št. avtorjev	Ime revije	Faktor vpliva (2018)	Citiranost
1	Castro & Gonçalves, 2018 (Brazilija)	2	Revista brasileira de enfermagem	/	1
2	Chia, 2013 (Singapur)	1	Singapore Nursing Journal	/	16
3	Davidson & Candy, 2016 (Kanada)	2	Worldviews on evidence-based nursing	2.500	20
4	Foli, et al., 2016 (Indija)	3	The Journal of nursing education	/	10
5	Gallegos, et al., 2017 (ZDA)	4	Nurse Education in Practice	1.665	7
6	Garnett & Button, 2018 (Avstralija)	2	Nurse educator	1.262	4
7	Mackavey & Cron, 2019 (ZDA)	2	Nurse education today	2.442	0
8	Mawhirter & Garofalo, 2016 (ZDA)	2	Clinical Simulation in Nursing	2.286	17
9	Roche, et. al., 2018 (ZDA)	6	Computers informatics nursing	1.029	2

Legenda: Št. – število; ZDA – Združene države Amerike

**Tabela 2:** Vsebinske značilnosti vključenih raziskav

Št.	Cilj raziskave	Metodologija	Elementi iger	Glavne ugotovitve
1	Analizirati vpliv igrifikacije na razvoj kompetenc v učni enoti Informatika v ZN in preučiti dojemanje igrifikacije s strani študentov ZN ter učiteljev.	Vzorec: 10 študentov ZN in 5 učiteljev. Ocenjevalno okolje: digitalno učno okolje z igrifikacijo in elektronski naslov. Analiza podatkov: opisna statistika in vsebinska analiza (komentarji).	Povratne informacije, socialni vpliv, točkovni sistem, točkovna lestvica, značke, ravni, napredovalna lestvica.	Raziskava prikazuje uspešno vključevanje igrifikacije v učno enoto Informatika v ZN in posledično večjo vključenost ter motiviranost študentov ZN.
2	Analizirati izobraževanje z igrifikacijo na tematiko obolenj pljuč v simuliranem okolju in preučiti njegov vpliv na študentovo dožemanje ter izkustvo.	Teorija: izobraževanje, temelječe na simulacijah. Vzorec: 151 študentov ZN. Ocenjevalno okolje: odprt / zaprt tip vprašalnika. Analiza podatkov: opisna statistika in komentarji.	Ravni, virtualni liki, povratne informacije, značke (pokali), izziv (kviz).	Integracija elementov iger s simuliranim okoljem pomaga krepiti znanje in praktične spretnosti študentov ZN ter popestri izobraževanje.
3	Analizirati izobraževanje z igrifikacijo o praksi, podprti z znanstvenimi dokazi, in preučiti njen vpliv na razvoj znanja in spretnosti študentov ZN.	Teorija: Bloomova taksonomija. Vzorec: 30 študentov ZN. Ocenjevalno okolje: izobraževalna igra z igrifikacijo in vprašalnik. Analiza podatkov: opisna statistika in vsebinska analiza (komentarji).	Točkovni sistem, točkovna lestvica, značke, pohvale (nagrade).	Nov način izobraževanja je bil s strani študentov ZN pozitivno sprejet in se je izrazil v ustreznem nivoju vključevanja, dvigu nivoja motivacije in napredovanju v usvajanju znanja.
4	Pridobiti mnenja in ocene vpliva značk na motivacijo pri izobraževanju študentov ZN o varnosti ter kakovosti ZN.	Teorija: model ARCS. Vzorec: 87 študentov ZN. Ocenjevalno okolje: digitalno učno okolje in vprašalnik. Analiza podatkov: opisna statistika in vsebinska analiza.	Značke.	Večina študentov ZN meni, da je vključevanje elementov iger smiselno in da pozitivno vplivajo na motivacijo pri učenju.
5	Opisati izkušnje študentov ZN pri izobraževanju iz ZN, ki temelji na izobraževalni igri in igrifikaciji.	Teorija: izobraževanje, temelječe na simulacijah. Vzorec: 57 študentov ZN. Ocenjevalno okolje: izobraževalna igra z igrifikacijo. Analiza podatkov: tematska analiza (komentarji).	Značke, točkovni sistem, točkovna lestvica, pohvale.	Večina študentov ZN je izrazila neprimernost in neučinkovitost igrifikacije v povezavi z učno enoto.
6	Raziskati motivacijski vpliv igrifikacije na študente ZN pri izobraževanju o osnovah bioznanosti.	Vzorec: 408 (leta 2015), 420 (leta 2016) in 418 (leta 2017) študentov ZN. Ocenjevalno okolje: digitalno učno okolje. Analiza podatkov: opisna statistika.	Značke.	Učenje z igrifikacijo v obliki značk motivira študente ZN k učenju, povečuje vključevanje in njihovo zanimanje za pridobitev novega znanja.
7	Oceniti vpliv inovativnega izobraževanja na učne izide in vključenost študentov ZN pri učni enoti družinska ZN.	Vzorec: 522 študentov ZN v osmih semestrih. Ocenjevalno okolje: digitalno učno okolje. Analiza podatkov: kompleksnejša analiza kvantitativnih podatkov.	Povratna informacija, socialni vpliv, izzivi.	Igrifikacija je vplivala na zavzetost študentov in učinkovitost učenja.
8	Spodbuditi izobraževanje in pripravljenost študentov ZN na klinično okolje ter krepiti medsebojno sodelovanje.	Vzorec: 7 študentov ZN v prvem semestru in 11 študentov ZN v četrtem semestru. Ocenjevalno okolje: simulacijska lutka in vprašalnik. Analiza podatkov: opisna statistika in tematska analiza (samoevalvacija).	Povratne informacije, točkovna lestvica, točkovni sistem, časovni pritisk, izzivi, pohvale (certifikat).	Vsi študenti ZN so izrazili, da je bila učna izkušnja zanje koristna, zanimiva in je zmanjšala njihov strah pred nepričakovanim. Študenti ZN so izkazali večjo pripravljenost na klinično okolje.
9	Z igrifikacijo povečati zavzetost in izboljšati izobraževanje študentov ZN.	Vzorec: 133 (leta 2015) in 121 (leta 2016) študentov ZN. Ocenjevalno okolje: izobraževalna igra in vprašalnik. Analiza podatkov: kompleksnejša analiza kvantitativnih podatkov.	Značke, povratne informacije, točkovna lestvica, točkovni sistem.	Igrifikacijo so študenti ZN dobro sprejeli. Izboljšali so učne izide pri izobraževanju iz ZN.

Legenda: Št. – število; ZN – zdravstvena nega; ARCS – model motivacije za pozornost, ustreznost, zaupanje in zadovoljstvo



**Slika 2:** Pogostost vključenih elementov iger (2a) in sočasna uporaba več elementov iger ter pozitivni in negativni vplivi (2b)

**Tabela 3:** Ocena kakovosti vključenih raziskav z elementi iger (zvezdice)

Št.	Tip raziskave	Št. RV	Ocena kakovosti raziskav po posameznih kriterijih	Skupna povprečna ocena kakovosti raziskav
1	Mešana raziskava	1	☆☆☆☆☆	3
2	Mešana raziskava	1	☆☆☆☆☆	2
3	Mešana raziskava	2	☆☆☆☆☆	4
4	Mešana raziskava	3	☆☆☆☆☆	4,5
5	Kvalitativna raziskava	1	☆☆☆☆☆	3
6	Kvantitativna raziskava	5	☆☆☆☆☆	3,4
7	Mešana raziskava	2	☆☆☆☆☆	3
8	Kvantitativna raziskava	1	☆☆☆☆☆	2,5
9	Kvantitativna raziskava	2	☆☆☆☆☆	3,5

Legenda: Št. – število; RV – raziskovalno vprašanje

v izobraževanje vključenih več elementov iger hkrati, kar prikazuje Slika 2 (b).

V osmih analiziranih raziskavah, ki so omenjale uporabo značk, pohval ali značk in pohval (Slika 2, a – navpične črte), so bile značke in / ali pohvale le v dveh primerih edini vključeni element iger (Slika 2, b – samo navpične črte). V šestih raziskavah so bili poleg značk in / ali pohval vključeni še drugi elementi iger: v dveh primerih točkovni sistemi oziroma lestvice (Slika 2, b – presečišče polj z navpičnimi in valovitimi črtami); v enem primeru izzivi in / ali povratne informacije (Slika 2, b – presečišče polj z navpičnimi črtami in pikami); v treh primerih pa oboje – točkovni sistemi oziroma lestvice ter izzivi in / ali povratne informacije (Slika 2, b – presečišče polj z navpičnimi in valovitimi črtami ter pikami v središču). V eno od analiziranih raziskav, v katero so bili vključeni elementi iger vseh treh skupin (značke in / ali pohvale, točkovni sistemi oziroma lestvice ter izzivi in / ali povratne informacije),

je bil dodatno vključen še socialni vpliv (Slika 2, b – presečišče polj z navpičnimi črtami, valovitimi črtami in pikami ter kroga, brez vzorca v središču). Elementi iger so se najpogosteje izrazili s pomočjo virtualnega (npr. digitalno učno okolje v obliki iger, kvizov, forumov itd.) in simulacijskega (npr. lutke in igre) okolja.

Največ obravnavanih člankov je bilo v obliki mešanih raziskav ( $n = 5$ ). Vse vključene raziskave so bile po začetnem MMAT-pregledu primerne za nadaljnjo oceno glede na MMAT, saj v povprečju obravnavajo dve raziskovalni vprašanji. Glavna ocena vključenih raziskav je prikazala srednjo stopnjo kakovosti vključenih metodologij glede na MMAT. Raziskava, ki so jo izvedli Foli in sodelavci (2016) in temelji na mešanih metodah raziskovanja, je dosegla najvišjo oceno po posameznih kriterijih (pet zvezdic) in skupno povprečno oceno metodološke kakovosti (4,5 od 5 skupnih točk) po kriterijih MMAT (Tabela 3).

## Diskusija

Izvedli smo iskanje, analizo in sintezo strokovne ter znanstvene literature s področja vključevanja igrifikacije v učne načrte zdravstvene nege. Izmed 9 vključenih raziskav jih je 8 ugotovilo oziroma zagovarjalo pozitiven vpliv igrifikacije v učnem procesu zdravstvene nege. Podobno kot naši rezultati so tudi rezultati drugih sistematičnih pregledov (Mora, et al., 2017; Subhash & Cudney, 2018) s področja igrifikacije prikazali vključevanje podobnih elementov iger, kot so značke, točke in povratne informacije, ter zaključili, da so primerni za vključevanje v visokošolsko izobraževanje. Elementi iger pozitivno vplivajo predvsem na zvišanje motivacije (Moritz, 2017; Castro & Gonçalves, 2018; Garnett & Button, 2018; White & Shellenbarger, 2018) in interesa (Garnett & Button, 2018), pripomorejo k pripravljenosti na klinično okolje (Chia, 2013; Garnett & Button, 2018), znižajo strah pred nepričakovanim (Garnett & Button, 2018) ter prispevajo k večji vključenosti (Moritz, 2017; Castro & Gonçalves, 2018). Študentom je vključevanje igrifikacije v učni proces v večini primerov zanimivo, saj menijo, da prispeva k boljši izkušnji (Kurz & Kinder, 2017; Roche, et al., 2017; Mackavey & Cron, 2019). V nasprotju s tem Gallegos (2017) ugotavlja, da igrifikacija negativno vpliva na izkušnje in zadovoljstvo študentov zdravstvene nege. Podobno ugotavljajo Fan in sodelavci (2015). V njihovi raziskavi študenti poudarjajo, da je učenje s podajanjem primerov ustrežnejše. Številne raziskave so pokazale, da imajo študenti pozitivno mnenje o uporabi igrifikacije pri učenju (Boeker, et al., 2013; Nevin, et al., 2013; Buckley & Doyle, 2014; Woo, 2014; Urh, et al., 2015), zelo malo raziskav pa je bilo izvedenih s strani fakultet in učiteljev (Hung, et al., 2017). Učitelji imajo velik vpliv na motivacijo študentov, zato je pomembno, da v učni proces vključijo sodobne, nove in inovativne tehnologije ter tako pridobijo zeleno pozornost. Ugotovljeno je bilo, da imajo tudi učitelji pozitivne izkušnje z novimi učnimi pristopi z uporabo igrifikacije (Brom, et al., 2009; Noraddin, 2015; Kopcha, et al., 2016; Alabbasi, 2018). Učitelji se zavedajo potrebe po motiviranju študentov in vključevanju novih pristopov v konvencionalna učna okolja (Noraddin, 2015). Alabbasi (2018) je zbiral podatke s strani učiteljev, ki so vključeni v program podiplomskega poučevanja o uporabi igrifikacije v spletnem učenju. Rezultati so pokazali pozitivno dožemanje uporabe igrifikacije, čeprav nekateri menijo, da ta lahko negativno vpliva na študente. V zadnjih letih, odkar je igrifikacija postala del izobraževanja, je večina raziskav pokazala pozitivne rezultate njenega vključevanja v učni proces. Toda in sodelavci (2018) pa se v raziskavi osredotočajo predvsem na negativne učinke igrifikacije na študente. Na podlagi sistematične kartografske raziskave so identificirali štiri negativne učinke: izgubo učinkovitosti, izgubo

zavzetosti, neželjeno vedenje in upadajoče učinke. Med najpogosteje navedenimi je izguba učinkovitosti, ki izhaja iz nalog in situacij, v katerih igrifikacija ovira ali škodi učnemu procesu študentov. V drugih raziskavah poročajo (De-Marcos, et al., 2014; Naik & Kamat, 2015) o izgubi uspešnosti, ki jo nekateri pojmujejo kot posledico prisotnosti demotivacijskih učinkov (Barata, et al., 2013; Hanus & Fox, 2014; Attali & Arieiev-Attali, 2015). Toda in sodelavci (2018) na podlagi analize ugotavljajo, da so se negativni učinki pojavili predvsem zaradi pomanjkanja ustreznih metodologij ali okvirov za načrtovanje in uvajanje vloge v učni kontekst (Faiella & Ricciardi, 2015), kar smo prikazali tudi z MMAT-oceno kakovosti metodologij v analiziranih raziskavah. Rezultati pregleda literature glede na MMAT prikazujejo najpogostejše omejitve: ne vključevanje taksonomij in teorij učenja, slabše povezave med posameznimi metodologijami, pomanjkljive kvalitativne oziroma kvantitativne analize podatkov, različna odstopanja pri interpretaciji podatkov in slabo oblikovane diskusije glede na izbrano metodologijo.

Raziskave so prav tako pokazale, da se igrifikacija dobro vključuje v učne enote, kot so informatika (Castro & Gonçalves, 2018), farmacija (Sera & Wheeler, 2017) in anatomija v zdravstveni negi (Roche, et al., 2018), oziroma v učne enote, kjer učno gradivo temelji bolj na kvantitativnih kot na kvalitativnih informacijah. Pridobljeni rezultati sicer prikazujejo, da imajo najkakovostnejšo oceno glede na MMAT raziskave (Foli, et al., 2016), ki vključujejo oba tipa informacij / podatkov. Nadalje ugotavljamo, da igrifikacije ni mogoče vključiti v vsako učno enoto s področja zdravstvene nege, zato jo morajo učitelji zelo previdno vpeljati kot glavno oziroma dopolnilno učno metodo in izbrati preverjeno tehnološko napredno ocenjevalno okolje. Nazorna primerjava je uporaba igrifikacije v obliki simulacijske igre Rezzly, kjer je raziskava Gallegosa in sodelavcev (2017) prikazala negativen odnos študentov, ki se je izražal v obliki neprimernosti in neučinkovitosti pri učenju teoretične zdravstvene nege. Raziskava, ki jo je izvedel Moritz (2017), pa je prikazala pozitiven odnos do igrifikacije, saj se je učinkovitost pri učenju klinične zdravstvene nege povečala s simulacijsko igro Rezzly.

V zadnjem obdobju je igrifikacija dobila pomembno vlogo pri izobraževanju v različnih spektrih zdravstvene nege. Kljub temu ostaja tradicionalna oblika izobraževanja na prvem mestu, saj predstavlja enega izmed lažjih in bolj dostopnih načinov izobraževanja. Med raznolikimi razlogi za navedeno izpostavimo vizijo izobraževalno-raziskovalne institucije (nagnjenost k raziskavam in napredku, nabava novejših simulacijskih in izobraževalnih opreme itd.), osebne lastnosti učiteljev (inovativnost, starost, ažurnost, natančnost, računalniška pismenost, časovna bariera itd.) in splošni razvoj same tehnologije (od neučinkovitosti komercialnih produktov, ki temeljijo na igrifikaciji, do

premalo verodostojnih raziskav s tega področja). Poleg volje za vključevanje informacijsko-komunikacijskih tehnologij in igrifikacije v delo učitelja je treba izvajalcu nuditi tudi predhodno usposabljanje in specializirano podporo za svetovanje ter reševanje morebitnih tehničnih in operativnih težav (Castro & Gonçalves, 2018). Prav tako učitelji pogosto oklevajo pri preizkušanju novih učnih pristopov zaradi strahu pred izgubo časa in slabših ocen študentov (Roysse & Newton, 2007; Roche, et al., 2018). Posledično bi bilo treba izvesti več raziskav, ki bi raziskale možnosti implementacije koncepta, testirale sprejemanje igrifikacije s strani učiteljev in študentov ter raven motiviranosti in uspešnosti študentov, ki uporabljajo elemente iger pri specifičnih učnih enotah zdravstvene nege.

Pregled literature je narejen z namenom pridobitve vpogleda v uporabo igrifikacije na področju izobraževanja v zdravstveni negi in preverjanja možnosti za njen prenos v slovensko okolje. Čeprav pregled literature prinaša veliko koristi, ima raziskava tudi določene omejitve. Izveden je bil pregled literature in ne celoten proces sistematičnega iskanja, analize in sinteze literature. Posledično obstaja možnost, da v pregled niso vključeni vsi članki, ki se nanašajo na igrifikacijo v učnem procesu zdravstvene nege. Kljub temu smo našli podobno število člankov kot že objavljena raziskava iz leta 2020 (Noyes, et al., 2020), ki je sistematično analizirala vpliv digitalnih značk v procesu izobraževanja v zdravstvu. V prihodnosti obstaja možnost izvedbe sistematičnega pregleda literature s področja igrifikacije v učnem procesu zdravstvene nege in poglobljene analize obstoječih ugotovitev.

## Zaključek

Igrifikacija je precej nov koncept na področju izobraževanja v zdravstveni negi. Učiteljem ponuja izziv, kako informacije podajati bolj zanimivo in privlačno. Obstoječe raziskave so bile izvedene v tujini, zato je treba ugotovitve interpretirati previdno in novo metodo igrifikacije pred implementacijo v slovensko učno okolje tudi testirati. Večina raziskav nakazuje pozitivne učinke igrifikacije v učnem procesu zdravstvene nege, ki se izražajo v obliki povečane motivacije in aktivnega sodelovanja študentov zdravstvene nege. Na drugi strani ne smemo zanemariti negativnega učinka igrifikacije, ki ob neprimernem vključevanju lahko privede do neučinkovitosti in nezavzetosti študentov. Ugotovljeno je bilo, da igrifikacija kot redna naprednejša oblika izobraževanja v zdravstveni negi uradno ni vključena niti v tuje niti v slovenske učne načrte, zato predstavlja izziv tako za raziskovalce kot za učitelje.

## Conflict of interest / Nasprotje interesov

The authors declare that no conflict of interest exist. / Avtorji izjavljajo, da ni nasprotja interesov.

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## Ethical approval / Etika raziskovanja

No approval by the Ethics Committee was necessary to conduct the study due to the selected research methodology. / Za izvedbo pregleda literature glede na izbrano metodologijo raziskovanja dovoljenje ali soglasje komisije za etiko ni bilo potrebno.

## Author contributions / Prispevek avtorjev

The literature review presented here was carried out in collaboration among all authors. NF developed a study design and supervised the literature review. NF, LG, PS and LC drafted the manuscript. NF, LG, LC, ND and GŠ conducted, analysed and interpreted data. All authors read, revised, and approved the final manuscript. / Pregled literature je delo vseh avtorjev. NF je načrtoval in nadziral pregled literature. NF, LG, PS in LC so napisali osnutek pregleda. NF, LG, LC, ND in GŠ so zbrali in izvedli analizo podatkov ter jih interpretirali. Vsi avtorji so prebrali, pregledali in odobrili končni rokopis.

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