Experience in Using Peer-to-Peer Platforms and Immersive Technologies in the Training of Future Masters of Pharmacy in Medical Lyceum

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Abstract

The present study has been conducted to evaluate the experience in using peer-to-peer platforms and immersive technologies in the training of future masters of pharmacy from the Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine. The selected participants were given the pre- and post-test containing multiple choice questions to assess the effectiveness of immersive technologies. Further, a self-designed structured questionnaire contained 10 questions with 5 options was delivered to consented participants through email and WhatsApp. The results of test presented that students attained an average of 26% in their pre-test while the average attained score post-test was 74% that showed a significant improvement with peer-to-peer platforms and virtual reality technology. The results of survey questions also showed an overall 86.73% satisfaction for the use of peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy. These results demonstrated that 90.81% showed agreement that they gained a high level of confidence through peer-to-peer platforms and virtual reality to handle patients in clinical practice. It can be concluded that participants of this study showed a strong agreement with positive experience in using peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy in medical lyceum.

Key words: *Peer-to-peer Platforms, Immersive Technologies, Virtual Reality Technology, Master of Pharmacy*

1. Introduction

The fast growing processes of civilization and changing characteristics of the globe, governments, individuals and mankind in general highlight the necessity to tackle a variety of issues including the most prominent one as protection and maintenance of health in the personal, national and global dimensions. In this context, improving the quality of healthcare professional education, particularly for pharmacy students, is highly desired. Though, instructional methodology has advanced from chalkboards to computer-based slideshows and beyond over the last few decades; nevertheless, the format of pharmacy classrooms had been slower to adapt. Regardless of the technologies available, pharmacy education generally entailed an educator providing information to a big classroom in the hopes of imparting knowledge. Low classroom attendance likely to be observed due to a variety of factors; yet, there is some data that suggests that increasingly low attendance is aided by the availability of lecture and lecture content via digital means [1-3]. Alternatives to lectures appear to be especially essential for 21st-century pharmacy students, who prefer more independent, task-based learning techniques and technological integration [4]. Pharmacists utilize problem-solving abilities to solve a variety of patient care concerns in their daily work.

The Accreditation Council for Pharmacy Education (ACPE) accentuate to educate students with the information, skills, and capacities to deliver patient-centered care and address problems [5]. Consequently, pharmacy students must be given several opportunities to practice their abilities. Practical experiences are, without a doubt, the most effective approach for students to prepare for a future in pharmacy. To gain practical experiences there has been difficulties such as finding adequate places for all students and ensuring that all students have comparable experiences. However, immersive technologies and peer-to-peer platforms as presented in Figure 1, emerges as alternative instruments for both faculty and students to exhibit a strong interest in, and demonstrate promising achievements in, many academic fields [6-8]. Peer-to-peer platforms with user-generated content on YouTube, Facebook, Instagram etc. provides an effective way for pharmacy students to learn. The case study method also helped students to find solutions required during the clinical situations [9].

However, simulations using mock experiences as immersive technology can range from a scripted scene with actors to the use of simulation dummies. Students can use previously learned information and abilities in a realistic clinical scenario in a safe and regulated educational environment using simulation-based learning [10]. The use of simulation-based learning in pharmacy school allows students to get clinical experience that they would not have

had otherwise, such as caring for patients in high-risk and less commonly encountered medical circumstances [11-13]. Using simulation to teach pharmacy practice skills may also resulted in knowledge that is transferable to patient care. Key areas in which simulation is being used in pharmacy education include therapeutics, patient safety, physical assessment, communication and populations to which students may have infrequent exposure. Virtual reality technology is a simulation technology that may provide an immersive and dynamic learning environment, addressing many of the problems that teachers faced for pharmacy education in the past. Virtual reality has the potential to become an essential element of pharmacy education with future technical and software development [14].

Students enthusiastically perceive the acquired knowledge and note the positive impact of these technologies on the assimilation of material in pharmaceutical education. The virtual reality system is equipped not only with a graphical headset, but also with tatty feedback. The technologies are being employed in higher education, however, the feedback related to the experience in using such immersive technologies is not well recorded and reported.

The peer-to-peer platforms and immersive technologies are being used for professional training of future masters of pharmacy in Ukraine for the purpose of erudition, competitiveness, and the growth of clinical thinking. The present study was designed to evaluate experience in using the peer-to-peer platforms and immersive technologies particularly virtual reality technology in the training of future masters of pharmacy from Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine.

2. Materials and Methods

2.1 Study design

To evaluate the of experience in using peer-to-peer platforms and immersive technologies particularly virtual reality technology in the training of future masters of pharmacy in medical lyceum, students/participants from the Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine were recruited through email and WhatsApp using convenience sampling method as described previously [15].
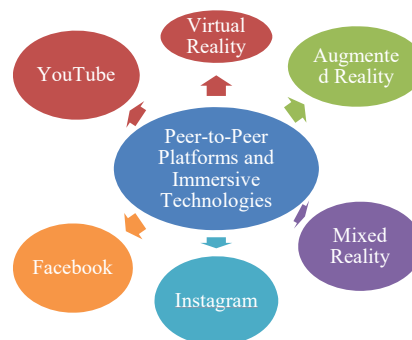

Fig. 1. An illustration presenting peer-to-peer platforms and immersive technologies for the training of future masters of pharmacy

From estimated sample size of three hundred students, 214 consented to participate in this study. The questionnaire was distributed through email and WhatsApp. The participant's demographic profile (age group, gender distribution) was also recorded. The selected participants were given the pre- and post-test/quiz containing multiple choice questions related to their course to assess effectiveness of peer-to-peer platforms and virtual reality technology upon their knowledge. However, this quiz did not affect their grading. Further, a self-designed structured questionnaire based on a five-point Likert scale was designed. The final questionnaire contained 10 questions with 5 options: strongly agree, agree, disagree, strongly disagree and neither agree nor disagree. Question 1 and 2 were related to the user-friendly interface and interaction levels of student-teacher, student-student and student-patient. The question 3 was related to sustainability of peer-to-peer platforms and virtual reality technology for professional training of future master students of pharmacy. The question 4, 5, 6 and 7 were related to the skill development of students of pharmacy using peer-to-peer platforms and virtual reality technology. Whereas, the question 8 was related to confidence gained by students through peer-to-peer platforms and virtual reality to handle patients in clinical practice. The question 9 was related to the development of critical thinking and helps to improve clinical skills of pharmacy students. Lastly, the question 10 was related to flexibility of time for both students and teachers while using Virtual reality technology and peer-to-peer platforms.

2.2 Data collection and analysis

The data from quiz/test and questionnaire was collected and subjected to analysis for the determination of effectiveness of peer-to-peer platforms and virtual reality in training of future masters of pharmacy from the Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine.

3. Results

From a total of three hundred participants only 214 students from the Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine consented to participate in this study. Whereas, from all consented participants, 98 filled the questionnaire and returned back. The results of test presented that students attain an average of 26% in their pre-test while the average attained score post-test was 74% that showed a significant improvement with peer-to-peer platforms and virtual reality technology (Figure 2) (Annex A). However, the demographic profile showed that the percentage of female (64.04%) participants was higher than the male (21.93%) participants. Similarly, the most of the participants were from an age group of 22-25 years (34.21%) while lowest percentage (22.81%) was from an age group of 26-29 years as presented in Figure 2.The results of the data obtained from the questionnaire showed overall positive response of using peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy in medical lyceum (Table 1). The survey results showed an overall 86.73% satisfaction for the use of peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy. The question 1 and 2 were related to the user-friendly interface and interaction levels and showed an overall agreement of 70.41% and 92.86% respectively. The question 3 was related to sustainability of peer-to-peer platforms and virtual reality technology for professional training of future master students of pharmacy with 54.08% response as strongly agree and 40.82% as agree while only 2.04% disagree and 1.02% neither agree nor disagree. The question 4, 5, 6 and 7 were related to the skill development of students of pharmacy using peer-to-peer platforms and virtual reality technology and results reported an overall agreement of 94.90%, 76.53%, 86.73% and 88.78%, respectively. Whereas, the question 8 was related to confidence gained by students through peer-to-peer platforms and virtual reality to handle patients in clinical practice with 54.08% and 36.73% strongly agreed and agreed responses, respectively. The question 9 was related to the development of critical thinking and helps to improve clinical skills of pharmacy students with 45.92% and 39.80% strongly agreed and agreed responses, respectively. Lastly, the question 10 was related to flexibility of time for both students and teachers while using Virtual reality technology and peer-to-peer platforms with 43.88% and 41.84% strongly agreed and agreed responses, respectively.

4. Discussion

If Peer-to-peer learning platforms and immersive virtual reality technology provides an effective way for students in pharmacy education for many years by engaging learning experiences. Recent technological advancements have substantially increased the potential usefulness of Peer-to-peer learning platforms and virtual reality for pharmacy education by providing immersive educational activities that mimic real world experiences to reinforce theoretical and practical concepts. With further technological and software development, virtual reality has the potential to become an integral part of pharmacy education [14]. From online patient networks and advocacy boards, to user-generated content on YouTube, Facebook, Instagram, etc. individualsfind many online avenues to share information and connect with one another about health. The use of simulation-based learning in pharmacy education provides students with clinical experiences that they otherwise would not likely acquire in training, such as caring for patients in high-risk and less frequently encountered medical scenarios [11, 16, 17]. Virtual reality refers to an artificial environment which is experienced through sensory stimuli provided by a computer and in which one's actions partially determine what happens in the environment. Virtual reality allows students to see through body tissues and visualize the underneath areas [18, 19]. Practice experience is an essential element in pharmacy education [20]. Currently, the policy of Ukraine in the pharmaceutical sector is oriented towards the priority of social interests in terms of pharmaceutical services and products, development of affordable and effective pharmacotherapy and disease prevention. Public needs and the realities of the development of higher pharmaceutical education in Ukraine predetermine the didactical aspects in professional training of future Masters of Pharmacy students [21]. The Faculty of Pharmacy of Bogomolets National Medical University, Ukraine has a positive experience of training pharmacists and masters of pharmacy on ethical principles [22]. A significant scientific contribution to the study of theoretical and applied aspects of public health and training of future professionals for the introduction of health protection technologies in the field of education was made by V. Bobrytska [23, 24]. The current study deals with the experience in professional training of future Masters of Pharmacy students using peer-to-peer learning platforms and immersive virtual reality technology that ensure acquisition of professional competencies.

Table 1: Questionnaire for evaluation of experience in using peer-to-peer platforms and immersive technologies in the training of future masters of pharmacy in medical lyceum

Q. #	Questions	N	SA		A		DA		SD		NAND	
			n	%	n	%	n	%	n	%	n	%
1	Peer-to-peer platforms and immersive technologies (VR) had a user-friendly interface	98	33	33.67	36	36.73	17	17.35	8	8.16	4	4.08
2	Real time student-teacher, student-student and student-patient interaction levels were maintained in virtual reality technology	98	55	56.12	36	36.73	2	2.04	1	1.02	4	4.08
3	Virtual reality and peer-to-peer platforms helps to sustain professional training of future master students of pharmacy	98	53	54.08	40	40.82	2	2.04	2	2.04	1	1.02
4	Peer-to-peer platforms and virtual reality helps to increase learning motivation	98	50	51.02	43	43.88	2	2.04	1	1.02	2	2.04
5	Virtual reality and peer-to-peer platforms improved the practical skills of future masters of pharmacy	98	41	41.84	34	34.69	9	9.18	7	7.14	7	7.14
6	Enough theoretical and practical knowledge was gained through virtual reality and peer-to-peer platform	98	46	46.94	39	39.80	2	2.04	3	3.06	8	8.16
7	Patient simulation using virtual reality help students to develop their interest in critical care.	98	44	44.90	43	43.88	5	5.10	2	2.04	4	4.08
8	Students gained enough confidence through peer-to-peer platforms and virtual reality to handle patients in clinical practice	98	53	54.08	36	36.73	2	2.04	1	1.02	6	6.12
9	Virtual reality and peer-to-peer platforms promotes the development of critical thinking and helps to improve clinical skills of pharmacy students	98	45	45.92	39	39.80	4	4.08	5	5.10	5	5.10
10	Virtual reality technology and peer-to-peer platforms provides flexibility of time for both students and teachers	98	43	43.88	41	41.84	6	6.12	2	2.04	6	6.12

SA = strongly agree, A = Agree, DA = Disagree, SD = Strongly disagree, NAND = Neither agree nor disagree

The findings of the previous studies showed that participants had a wide variety of views about the use of augmented and virtual reality technologies, as well as different needs regarding technological solutions in learning environments [25]. However, in another study, senior baccalaureate nursing students participated in a pharmacology case exercise using an "escape room" type strategy focused on medication overdose management. Students described this activity as "creative," "challenging," and "team-building" and all strongly agreed that this strategy should be used in future courses [26]. Additionally, one article that analyzed use of these products in a collegiate writing class found that students had "increased commitment and energy," and that it revealed the rewards of perseverance while fostering collaboration [27]. In present study, 214 participants from the Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine consented to participate. The drastic improvements in pre- and post-test scores were observed in present study as students attained an average of 26% in their pre-test while the average attained score post-test was 74%. These findings are consistent with previously reported study regarding the use of simulated learning game to teach pharmacy students clinical concepts [28]. We have also conducted a survey with pre-designed questions to determine the effectiveness of peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy in medical lyceum from the Pharmaceutical Faculty of Bogomolets National Medical University, Ukraine. The survey results showed an overall 86.73% satisfaction for the use of peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy. These results are comparable and similar to other studies [22, 28]. The question 1 and 2 in present study were related to the user-friendly interface and interaction levels and showed an overall agreement of 70.41% and 92.86% respectively. The question 3 was related to sustainability of peer-to-peer platforms and virtual reality technology for professional training of future master students of pharmacy with 54.08% response as strongly agree and 40.82% as agree while only 2.04% disagree and 1.02% neither agree nor disagree. The question 4, 5, 6 and 7 were related to the skill development of students of pharmacy using peer-to-peer platforms and virtual reality technology and results

reported an overall agreement of 94.90%, 76.53, 86.73% and 88.78%, respectively. It has been observed that using simulation/virtual reality technology to teach pharmacy practice skills may result in knowledge that is transferable to patient care. Other practical applications for simulation/virtual reality technology includes enhancing inter-professional healthcare team dynamics and the skills of practicing healthcare professionals. It has also been suggested that educators should continue to be creative in the incorporation of simulation/virtual reality technology into pharmacy education and conduct more studies on the impact of simulation education on patient care to demonstrate the efficacy of this teaching modality [29]. The question 8 in present study was related to confidence gained by the students through peer-to-peer platforms and virtual reality to handle patients in clinical practice with 54.08% and 36.73% strongly agreed and agreed responses, respectively. These finding are similar to previously reported studies [9, 28]. Similarly, Kiernan [30] also reported a high level of confidence and competence using simulation technology. The question 9 was related to the development of critical thinking and helps to improve clinical skills of pharmacy students with 45.92% and 39.80% strongly agreed and agreed responses, respectively. Lastly, the question 10 was related to flexibility of time for both students and teachers while using virtual reality technology and peer-to-peer platforms with 43.88% and 41.84% strongly agreed and agreed responses, respectively. These findings were comparable with previous study with an observation that participants preferred virtual reality technology due to the fact that students can easily attend classes at a convenient time. The findings of our study proved that peer-to-peer platforms and virtual reality technology benefits future masters of pharmacy in their professional career. It has also been reported that such learning process organization improve the academic performance of future masters of pharmacy students and contribute to an increase in their general motivation to study professionally-oriented disciplines [21].

5. Conclusion

The current work explored the experience in using virtual reality technology and peer-to-peer platforms by master students of pharmacy in Bogomolets National Medical University, Ukraine. An overall satisfactory response towards the positive use of virtual reality technology and peer-to-peer platforms was observed through a self-designed questionnaire with drastic improvements in quiz scores pre- and post-test. It can also be concluded that participants of this study showed a strong agreement with positive experience in using peer-to-peer platforms and virtual reality technology in the training of future masters of pharmacy in medical lyceum. Such technologies with advancement must be included in the curriculum of higher education students to attain professional skills more effectively.

References

[1] Bukoye, O. T., & Shegunshi, A.: *Impact of engaging teaching model (ETM) on students' attendance*. In: Cogent Education, vol. 3(1), pp.1221191 (2016)

[2] Kassarnig, V., Bjerre-Nielsen, A., Mones, E., Lehmann, S., & Lassen, D. D.: *Class attendance, peer similarity, and academic performance in a large field study*. In: PloS One, vol. 12(11), pp.e0187078 (2017)

[3] Hassel, S., & Ridout, N.: *An investigation of first-year students' and lecturers' expectations of university education*. In: Frontiers in Psychology, vol. 8, pp.2218 (2017)

[4] Shatto, B., & Erwin, K.: *Teaching millennials and generation Z: Bridging the generational divide*. In: Creative Nursing, vol. 23(1), pp.24–28 (2017)

[5] Engle, J. P., Wadelin, J. W., Boyer, J. G., Travlos, D. V., & Rouse, M. J.: *Accreditation council for pharmacy education: 2020 annual report*. In: American Journal of Pharmaceutical Education, vol. 85(6), pp. 8736 (2021)

[6] Detyna, M., & Kadiri, M.: *Virtual reality in the HE classroom: feasibility, and the potential to embed in the curriculum*. In: Journal of Geography in Higher Education, vol. 44(3), pp. 474–485 (2020)

[7] Stojšić, I., Ivkov-Džigurski, A., Maričić, O., Stanisavljević, J., Milanković Jovanov, J., & Višnić, T.: *Students' attitudes toward the application of mobile augmented reality in higher education*. In: Drustvena Istrazivanja, vol. 29(4), pp. 535–554 (2020)

[8] Nausher, A., Akhtar, K., & Ali, S.: *Preparation, characterization, in vitro antibacterial activity and comparative pharmacokinetic study of orally administered curcumin loaded PLGA nanoparticles*. In: J Toxicol Pharmaceut Sci, vol. 3(1-2), pp. 28-33 (2019)

[9] Korniichuk, O. Y., Bambyzov, L. M., Kosenko, V. M., Spaska, A. M., & Tsekhmister, Y. V.: *Application of the case study method in medical education*. In: International Journal of Learning Teaching and Educational Research, vol. 20(7), pp. 175–191 (2021)

[10] Chernikova, O., Heitzmann, N., Stadler, M., Holzberger, D., Seidel, T., & Fischer, F.: *Simulation-based learning in higher education: A meta-analysis*. In: Review of Educational Research, vol. 90(4), pp. 499–541 (2020)

[11] *Accreditation Council for Pharmacy Education. Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree* [electronic Resource]: Adopted January 15, 2006: Released February 17, 2006: Effective July 1, 2007. In: Accreditation Council for Pharmacy Education. (2006)

[12] Halamek, L. P., Cady, R. A. H., & Sterling, M. R.: *Using briefing, simulation and debriefing to improve human and system performance*. In: Seminars in Perinatology, vol. 43(8), pp. 151178 (2019)

[13] Romero-Collado, A., Baltasar-Bagué, A., Puigvert-Viu, N., Rascón-Hernán, C., & Homs-Romero, E.: *Using simulation and electronic health records to train nursing students in prevention and health promotion interventions*. In: Nurse Education Today, vol. 89(104384), pp. 104384. (2020)

[14] Coyne, L., Merritt, T. A., Parmentier, B. L., Sharpton, R. A., & Takemoto, J. K.: *The past, present, and future of virtual reality in pharmacy education*. In: American Journal of Pharmaceutical Education, vol. 83(3), pp. 7456. https://doi.org/10.5688/ajpe7456 (2019)

[15] Murphy, R., Clissold, E., & Keynejad, R. C.: *Problem-based, peer-to-peer global mental health e-learning between the UK and Somaliland: a pilot study*. In: Evidence-Based Mental Health, vol. 20(4), pp. 142–146. https://doi.org/10.1136/eb-2017-102766 (2017)

[16] Falcone, R. A., Jr, Daugherty, M., Schweer, L., Patterson, M., Brown, R. L., & Garcia, V. F.: *Multidisciplinary pediatric trauma team training using high-fidelity trauma simulation*. In: Journal of Pediatric Surgery, vol. 43(6), pp. 1065–1071 (2008)

[17] Paige, J. T., Kozmenko, V., Yang, T., Paragi Gururaja, R., Hilton, C. W., Cohn, I., Jr, & Chauvin, S. W.: *High-fidelity, simulation-based, interdisciplinary operating room team training at the point of care*. In: Surgery, vol. 145(2), pp. 138–146 (2009)

[18] Cao, C., & Cerfolio, R. J.: *Virtual or augmented reality to enhance surgical education and surgical planning*. In: Thoracic Surgery Clinics, vol. 29(3), pp. 329–337 (2019)

[19] Siyar, S., Azarnoush, H., Rashidi, S., & Del Maestro, R. F.: *Tremor assessment during virtual reality brain tumor resection*. In: Journal of Surgical Education, vol. 77(3), pp. 643–651 (2020)

[20] Teramachi, H., Ino, Y., Sugita, I., Nishio, Y., Yoshida, A., Hayashi, Y., Esaki, H., Saito, K., Noguchi, Y., Iguchi, K., & Tachi, T. Evaluating communication skills after long-term practical training among Japanese pharmacy students. In: *Currents in Pharmacy Teaching & Learning*, vol. 10(4), pp. 446–452 (2018)

[21] Reva, T., Nizhenkovska, I., & Holik, O.: Didactical aspects of professional training of future Masters of Pharmacy students. In: *CBU International Conference Proceedings*, vol. 7, pp. 606-610. https://doi.org/10.12955/cbup.v7.1426 (2019)

[22] Pelo, I. M., Reva, T. D., Nizenkovska, I. V., Kozak, N. D., & Konovalova, L. V.: *Trends in the professional training of pharmacy specialists in Ukraine*. In: Medicni Perspektivi (Medical Perspectives), vol. 25(3), pp. 4–8 (2020)

[23] Bobrytska, V.: *Currently conducted educational reforms in Ukraine: achievements and new challenges*. In: Proceedings of the National Aviation University. Series: Pedagogy, Psychology, vol. 14. doi: https://doi.org/10.18372/2411-264x.14.13707 (2019)

[24] Bobrytska , V., Reva, T.D., Protska S.M., Chkhalo O.M.: *Training of Master's degree seekers in Education in Ukraine: Current Challenges, Problems, Findings*. In: Bulletin of the National Aviation University. Series: Pedagogy. Psychology, vol. 1(10), pp. 20-23 (2017)

[25] Detyna, M., Stojšić, I., & Dommett, E. J.: *Investigating mechanisms to increase student engagement in higher education learning environments: Testing emerging and immersive technologies to meet teaching needs. In: Proceedings of the International Scientific Conference - Sinteza 2021*. Singidunum University. (2021)

[26] Berndt, J. L.: *Using "Breakout Boxes" for pharmacology review*. In: Nursing Education Perspectives, vol. 40(2), pp. 116–117 (2019)

[27] Detwiler, S., Jacobson, T., & O'Brien, K.: *Breakout EDU: Helping students break out of their comfort zones*. In: College & Research Libraries News, vol. 79(2), pp. 62 (2018)

[28] Korenoski, A. S., Ginn, T. R., & Seybert, A. L.: *Use of an immersive, simulated learning game to teach pharmacy students clinical concepts of toxicology*. In: Currents in Pharmacy Teaching & Learning, vol. 13(5), pp. 556–559 (2021)

[29] Katoue, M. G., & Ker, J.: *Simulation for continuing pharmacy education: Development and implementation of a simulation-based workshop on medicines reconciliation for pharmacists: Development and implementation of a simulation-based workshop on medicines reconciliation for pharmacists*. In: The Journal of Continuing Education in the Health Professions, vol. 39(3), pp. 185–193 (2019)

[30] Kiernan, L. C.: *Evaluating competence and confidence using simulation technology*. In: Nursing, vol. 48(10), pp. 45–52 (2018)

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