

Use of LEGO Serious Play® in Nursing Education: A Descriptive Cross-Sectional Study

Aim/objective: to compare the rates of participation, enjoyment, and immersion in the subject matter and the absence of negative emotions during the activity carried out in two different subjects.

Background: The Lego Serious Play® methodology is an active methodology that uses play and construction with LEGO® blocks to foster participation, creativity, and meaningful learning. It is an imagination-based mode of activity that integrates cognitive, social, and emotional dimensions with the benefits of play to influence organizational and learning challenges.

Design: A multicenter cross sectional study was carried out.

Methods; The teachers provided the LEGO® pieces, and students, organized in groups of 8 to 10 members, built a representation of the assigned concept. Subsequently, they developed a metaplan using colored Post-it® to document symptoms, problems, treatments, and nursing care related to two subjects of the degree. In the final session, students presented their LEGO® figures, displayed their Metaplan, and collaboratively explained the concept. At the end, they completed the Gamex Scale.

Results: This methodology can be applied in any subject and course since the results of the Gamex scale offer similar results, showing high rates of participation, enjoyment, and immersion in the subject matter. Its combination with the metaplan helps the fixation of concepts and eliminates the drawbacks detected by other authors.

Conclusions: Gamification in nursing subjects has shown a positive impact, achieving high participation and satisfaction rates in group activities. The combination of both methodologies has fostered critical thinking and creativity.

Key words: Lego Serious Play, mental health, motivation, thinking, learning, students.

INTRODUCTION

Active methodologies encourage critical thinking and student participation in the classroom. While lectures and teacher-centered teaching are still relevant, it is important to complement them with more participatory methodologies such as experiential learning that focus on experience, action and the intuitive part of knowledge acquisition (Granados López & García Zuluaga, 2016). In the context of health sciences, competency-based learning and students experimenting, discovering autonomously and establishing connections in teams are positively valued (Pedregosa-Fauste et al., 2024). Stimulating creative thinking is crucial to generate innovative solutions to the challenges faced by students (Koivisto et al., 2016; Gkogkidis & Dacre, 2021; Oda-Domínguez, 2020). Recent studies have indicated that the use of gamification in the classroom improves the motivation of these during their teaching-learning process (García-Casaus et al., 2020; Oda-Domínguez, 2020), promotes meaningful learning, allowing the development of analytical skills and achieving a positive impact on students (Elkelish & Ahmed, 2022; Pedregosa-Fauste et al., 2024; Warburton et al., 2022).

The LEGO Serious Play® (LSP®) approach is a methodology that uses play and construction with Lego blocks to encourage participation, creativity and meaningful learning. It can be defined as an imagination-based mode of activity that integrates cognitive, social and emotional dimensions with the benefits of play to influence organizational challenges. (de Saille et al., 2022; ElKelish & Ahmed, 2022; Garden, 2022).

The studies also highlight that the LSP® methodology improves students' cognitive abilities, allowing them to better understand the topics covered, increasing their affective commitment, enjoyment and interest in the task they develop. Likewise, it seems to improve peer interaction and students' independence and empowerment. Specific studies carried out within undergraduate nursing education highlight that it generates benefits in the development of resilience and in the formation of professional identity, as well as in the reflective capacity of future nursing professionals (Pedregosa-Fauste et al., 2024; Warburton et al., 2022). Thus, this methodology offers an innovative approach to teaching and learning, allowing students to explore complex concepts in a practical and collaborative way. By integrating the playful dimension in the learning process, this methodology offers an attractive and effective alternative for teaching in the university setting. However, it also presents some drawbacks such as the difficulty of representing abstract concepts (de Saille et al., 2022; ElKelish & Ahmed, 2022).

The metaplan is a participatory methodology for collecting key data, consisting of the use of cards of different colors and shapes on which interaction and a constant flow of discussion are encouraged (Garden, 2022). These cards will be placed on panels in view of the participants. The advantages of this technique include equal participation, visualization of the work done, orderly debate to determine points of consensus and dissent, raising awareness and co-creation of alternatives, effective organization of the results, and efficiency and optimization of time. However, disadvantages are also identified such as training and practice in the technique by the educator to have control of the session and avoid value judgments (de Saille et al., 2022; ElKelish & Ahmed, 2022).

The combination of both methodologies improves group dynamization and moderation through the visualization of images and allows the regulation of decision making and the best solution of problems in a group context (Delgado Fernández & Solano González, 2009). Which together with the Metaplan technique, improves group dynamization and moderation through the visualization of images and allows the regulation of decision making and the best solution of problems in a group context (Delgado Fernández & Solano González, 2009, Veiga-Seijo, 2020).

The use of the LSP® methodology combined with the Metaplan technique is expected to significantly improve students' gamification experience with respect to the concepts related to the subjects involved, compared to traditional teaching methodologies.

Therefore, the aim of this study is to determine the impact of the LSP® methodology combined with the Metaplan technique on the undergraduate nursing students' satisfaction using the GAMEX scale and to analyze both the level of enjoyment and the absence of negative affect during the activity, as well as the development of critical thinking and creativity, crucial aspects for the professional practice of nursing.

METODOLOGY

Study design

A multicenter, observational, descriptive, and cross-sectional study was conducted. This design was chosen to evaluate the impact of the LSP[®] methodology in combination with the Metaplan technique on the learning, motivation, and satisfaction of undergraduate nursing students in two universities: a public university in the Community of Madrid and a public university in the Community of Catalonia. The transversality of the study allows an evaluation of the effects of the intervention at a specific moment of the academic year.

Participants / Sample

The study population included all undergraduate nursing students enrolled in the universities mentioned above. Non-probability convenience sampling was used, inviting students to voluntarily participate in the study. Beforehand, detailed information about the study was provided, assuring that participation would not affect their academic grades or have repercussions on the course.

The sample size was 166 students who participated in the different sessions. Sociodemographic characteristics such as gender, age, and previous gamification experience were considered in the analysis of the results.

Intervention Process

The intervention consisted of two two-hour sessions of group work, with an average size of 8 to 10 students per group. The students worked with the LSP[®] methodology, where they had to build with LEGO blocks representations of key concepts related to the subjects of Physiology, in one university, and Mental Health, in the other; complementing the activity with the Metaplan technique.

Session Descriptions

Session 1: Introduction and Construction with LSP[®].

Student groups were instructed to build a LEGO model representing a concept from the selected subjects. From this construction, students discussed and reflected in teams.

Subsequently, the groups developed a Metaplan, where they placed their key ideas on different colored Post-it[®] to identify symptoms, problems, treatments and care related to the concept addressed.

Session 2: Presentation and Evaluation

In this session, the groups presented their LEGO models and Metaplans to the rest of the class. Each group described their construction process, explaining how their figure represented the concept worked on and what elements were critical for its development.

A mural was placed at the end of the classroom with photographs of the LSP® constructions and explanatory posts about them. Figure 1 shows the result of the work done by the students.

Figure 1. LEGO representation of nervous anorexia. In the meta-plan, the LEGO image is shown in addition to an explanation of the disease in orange post-its, the symptomatology in yellow post-its and the care represented by blue post-its.

In addition, the GAMEX Scale was applied to measure the motivation, satisfaction and level of enjoyment experienced by the students during the activity.

Data collection

Data collection was carried out during the months of March and April 2024 in the undergraduate nursing classes of a public university in the Community of Madrid and a public university in the Community of Catalonia.

Study variables

Two types of variables were included:

1. Sociodemographic variables: gender, age, previous experience with gamification, participation in paid work.
 2. Main variable: GAMEX scale: This scale, validated in Spanish, evaluates the experience of students in gamification activities. It consists of 27 items divided into 6 dimensions:
 - Enjoyment: Degree of fun or pleasure during the activity.
 - Absorption: Level of abstraction and forgetfulness of the immediate environment.
 - Creative Thinking: Stimulation of creativity and originality.
 - Activation: Ability of the activity to activate and motivate participants.
 - Absence of negative affect: Evaluation of possible negative feelings during the activity.
 - Mastery: Feeling of control and leadership during the experience.
- Each item was rated on a 5-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree).

Data analysis

Data were entered and analyzed using SPSS version 26.0 statistical software. An exploratory analysis was performed to identify outliers or inconsistencies. Sociodemographic variables were analyzed using descriptive statistics, calculating absolute and relative frequencies. For quantitative variables, measures of central tendency (mean and standard deviation) were used and the 95% confidence interval was calculated.

A Kolmogorov-Smirnov test was performed to verify the normality of the variable distributions. In case of non-normality, nonparametric tests were applied. A value of $p < 0.05$ was considered significant.

Ethical considerations

This study, and its written consent, was approved by the Ethics Committee of the Universitat Rovira i Virgili (CEIPSA-2023-PRD-0031) and was conducted in accordance with the principles articulated in the Declaration of Helsinki, as well as Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on Data Protection (REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the Protection of Individuals. Concerning the Processing of Personal Data and the Free Movement of Such Data and Repealing D, 2016) ensuring correct data coding and matching.

RESULTS

A total of 166 students participated in the first data collection, of whom 86.1% were female ($n=143$), with a mean age of 22.25 (SD: 4.82, Min: 18 Max: 52), 56.6% ($n=94$) were studying at the public university, 40.4% ($n=67$) came from the first year, 16.9% ($n=28$) from the second year, 41.6% ($n=69$) from the third year and 1.2% ($n=2$) from the fourth year, 24.7% ($n=41$) indicated that they had never done gamification previously vs. 9, 0% ($n=15$) who did not know and 66.3% ($n=110$) who had practiced it, 66.3% ($n=110$) did not perform any paid work and 83.73% ($n=139$) of the students were satisfied or very satisfied with the activity, this information can be expanded in Table 1.

Table 1. Sociodemographic characteristics of the sample.

Regarding the results of the Gamex scale, 80.80% ($n = 134$) of the students agreed or strongly agreed that playing was fun, 80.20% ($n = 133$) liked playing, and 75.30 ($n = 125$) enjoyed playing very much, with 74.10% ($n = 123$) of the students finding the experience pleasurable. On the other hand, 79.50% ($n = 132$) believed that playing was entertaining, but only 35.50% ($n = 59$) would play that game by themselves; 47% ($n = 78$) made them forget where they were; 44.60% ($n = 74$) forgot their immediate surroundings while playing; 38.60% ($n = 64$) were oblivious to their surroundings; and 69.90% ($n = 116$) found that playing awakened their imagination. Regarding feelings generated by playing, 72.30% ($n = 120$) felt creative, 47.60% ($n = 79$) were adventurous, and 71.10% ($n = 118$) were active while playing, versus 22.30% ($n = 37$) who felt nervous, 3.60% ($n = 6$) annoyed, 2.40% ($n = 4$) hostile, and 5.40% ($n = 9$) frustrated during play. The means and deviations for each item and dimension of the GAMEX scale can be found in Table 2.

Table 2. Results of the GAMEX scale and its dimensions.

Analysis of the dimensions of the GAMEX scale

Regarding the analysis of the dimensions of the scale according to sociodemographic variables, we can say that both men and women enjoy the activity, since there are no statistically significant differences by sex in any of the dimensions. There are also no differences in the scope of application, with similar results in the dimensions in both public and private universities, only statistically significant differences were observed in

the domain dimension ($p<0.001$), with a higher score in the private university (3.17 ± 0.74) than in the public university (2.58 ± 1.03). The LSP® methodology can be applied in any course, since the results of the scale are similar in both lower and higher courses. On the other hand, it is not necessary to have previously used gamification or to know what it consists of, since similar results are obtained in all dimensions; this information can be expanded in Table 3.

Table 3: Scores on the dimensions of the GAMEX scale according to sociodemographic variables

Regarding the correlations with satisfaction and age, statistically significant differences are observed in all dimensions except in the domain regarding satisfaction. The dimensions of fun, absorption, creative thinking, and activation present a directly proportional relationship with satisfaction with the activity, while the dimension of absence of a negative effect presents an inversely proportional relationship with respect to satisfaction with the activity, as shown in Table 4.

Table 4. Correlations between the dimensions of the GAMEX scale and satisfaction and age.

Analysis satisfaction with activity

With respect to the analysis of satisfaction according to sociodemographic variables, no statistically significant differences were found, and this information can be seen in Table 5. Regarding the analysis of satisfaction according to sociodemographic variables, no statistically significant differences were found; this information can be expanded in Table 5.

Table 5. Analysis of satisfaction with sociodemographic variables.

DISCUSSION

The results of this study confirm the effectiveness of the LSP® methodology combined with the Metaplan technique in the development of key competencies such as critical thinking, creativity, and teamwork in undergraduate nursing students. The high levels of motivation and satisfaction recorded through the GAMEX Scale support the use of gamification as an effective strategy to improve learning in university environments, particularly in disciplines such as nursing, where the ability to make decisions and solve problems is essential. This finding is in line with previous studies that have shown that gamification and active methodologies not only increase students' enjoyment but also improve their engagement with the academic content and their deep understanding of the topics covered (García-Casaus et al., 2020; Oda-Domínguez, 2020).

The use of LSP® in this context has allowed students to transform abstract concepts into visual and tangible representations, facilitating the understanding of complex topics related to mental health and physiology. In addition, the combination with the Metaplan technique has enhanced students' ability to organize and synthesize information in a structured way, fostering collaborative discussions and team problem solving. These results suggest that, by combining playful techniques with visual organization tools, it is possible to develop competencies that are fundamental for professional nursing practice, such as reflective analysis and decision-making in clinical situations (Delgado Fernández

& Solano González, 2009; Pedregosa-Fauste et al., 2024). Furthermore, the combined use of both methodologies has made it possible to overcome some limitations that other studies with LSP had previously evidenced (Pedregosa-Fauste et al., 2024).

This effect has been observed in other studies on gamification in higher education, where the ability of these methodologies to generate more meaningful learning by involving both cognitive and emotional dimensions of students is highlighted (Koivisto et al., 2016).

Limitations and lines of future research

This study presents certain limitations that should be considered. The sample size, although adequate for a descriptive analysis, could be expanded in future research to obtain more robust and generalizable results. Also, the limited diversity of participants in terms of gender and age could have influenced some results, especially in terms of enjoyment and participation.

Future research should focus on exploring the long-term impact of the LSP® methodology and its application in clinical settings to determine whether the skills acquired during these activities are effectively transferred to professional practice. In addition, it would be valuable to investigate the applicability of this methodology to other topics within nursing and health sciences, beyond mental health and physiology, in order to determine whether the observed benefits are consistent across different subject areas. Finally, longitudinal studies could evaluate the impact of LSP® not only on academic performance but also on the development of clinical competencies over time (Suleiman-Martos et al., 2022).

CONCLUSIONS

The implementation of active methodologies such as LSP® and Metaplan can transform traditional teaching, bringing added value to the training of future healthcare professionals. The results obtained through the GAMEX Scale reflect high levels of satisfaction and motivation, indicating that gamification, applied in academic environments, can significantly improve the learning experience. This playful and collaborative approach, in addition to favoring the understanding of complex concepts, generates a more dynamic and participatory learning environment, in which students feel more engaged and active in their learning process, and reinforces essential competencies for professional nursing practice, such as critical analysis, decision-making, and problem solving. These methodologies allow students not only to learn but also to actively experiment, which can enhance their performance in real clinical settings as well as foster critical thinking, creativity, and team collaboration. Their inclusion in the nursing curriculum is recommended, given their ability to develop key competencies, enhance the educational experience, and prepare students for the challenges of professional practice.

There has been no funding for this research.

BIBLIOGRAPHIC REFERENCES

de Saille, S., Kipnis, E., Potter, S., Cameron, D., Webb, C. J. R., Winter, P., O'Neill, P., Gold, R., Halliwell, K., Alboul, L., Bell, A. J., Stratton, A., & McNamara, J. (2022). Improving Inclusivity in Robotics Design: An Exploration of Methods for Upstream Co-Creation. *Frontiers in Robotics and AI*, 9, 731006. <https://doi.org/10.3389/frobt.2022.731006>

Delgado Fernández, M., & Solano González, A. (2009). Estrategias didácticas creativas en entornos virtuales para el aprendizaje. *Revista Electrónica "Actualidades Investigativas En Educación,"* 9(2), 1–21. <https://www.redalyc.org/articulo.oa?id=44713058027>

ElKelish, W. W., & Ahmed, R. (2022). Advancing accounting education using LEGO® Serious Play simulation technique. *Accounting Education*, 31(2), 167–183. <https://doi.org/10.1080/09639284.2021.1905011>

García-Casaus, F., Cara-Muñoz, J. F., Martínez-Sánchez, J. A., & Cara-Muñoz, M. M. (2020). La gamificación en el proceso de enseñanza-aprendizaje: una aproximación teórica. *Logía: Educación Física y Deporte*, 1(1), 16–24. <https://dialnet.unirioja.es/servlet/articulo?codigo=7643607>

Garden, C. L. P. (2022). Lego Serious Play: Building engagement with cell biology. *Biochemistry and Molecular Biology Education*, 50, 216–228. <https://doi.org/10.1002/bmb.21608>

Gkogkidis, V., & Dacre, N. (2021). How to use Lego Serious Play as a Gamification Teaching and Learning Framework? A Responsible Management Approach. *SSRN Electronic Journal*, 1–13. <https://doi.org/10.2139/ssrn.3829949>

Gómez-Urquiza, J. L., Gómez-Salgado, J., Albendín-García, L., Correa-Rodríguez, M., González-Jiménez, E., & Cañadas-De la Fuente, G. A. (2019). The impact on nursing students' opinions and motivation of using a "Nursing Escape Room" as a teaching game: A descriptive study. *Nurse Education Today*, 72, 73–76. <https://doi.org/https://doi.org/10.1016/j.nedt.2018.10.018>

Granados López, H., & García Zuluaga, C. L. (2016). El modelo de aprendizaje experiencial como alternativa para mejorar el proceso de aprendizaje en el aula. *ÁNFORA*, 23(41), 37–54. <https://doi.org/10.30854/anf.v23.n41.2016.140>

Koivisto, J.-M., Multisilta, J., Niemi, H., Katajisto, J., & Eriksson, E. (2016). Learning by playing: A cross-sectional descriptive study of nursing students' experiences of learning clinical reasoning. *Nurse Education Today*, 45, 22–28. <https://doi.org/https://doi.org/10.1016/j.nedt.2016.06.009>

Oda-Domínguez, H. (2020). La gamificación: una revisión sistemática y proyecto innovador con relación a la motivación y percepción subjetiva del esfuerzo [Trabajo de fin de Máster, Universidad de la Laguna.]. In *RIULL - Repositorio institucional*. <https://riull.ull.es/xmlui/handle/915/19788>

Pedregosa-Fauste, S., Tejero-Vidal, L. L., García-Díaz, F., & Martínez-Rodríguez, L. (2024). Using LEGO® Serious Play for students' Critical-Reflective Reasoning development in the construction of the nursing metaparadigm. *Nurse Education Today*, 134, 106104. <https://doi.org/10.1016/j.nedt.2024.106104>

REGLAMENTO (UE) 2016/679 DEL PARLAMENTO EUROPEO Y DEL CONSEJO de 27 de Abril de 2016 Relativo a La Protección de Las Personas Físicas En Lo Que Respecta al Tratamiento de Datos Personales y a La Libre Circulación de Estos Datos y Por El Que Se Deroga La D, 88 (2016).

Suleiman-Martos, N., García-Lara, R. A., Membrive-Jiménez, M. J., Pradas-Hernández, L., Romero-Béjar, J. L., Dominguez-Vías, G., & Gómez-Urquiza, J. L. (2022). Effect of a game-based intervention on preoperative pain and anxiety in children: A systematic review and meta-analysis. In *Journal of Clinical Nursing* (Vol. 31, Issues 23–24, pp. 3350–3367). John Wiley and Sons Inc. <https://doi.org/10.1111/jocn.16227>

Warburton, T., Brown, J., & Sandars, J. (2022). The use of LEGO® SERIOUS PLAY® within nurse education: A scoping review. *Nurse Education Today*, 118, 105528. <https://doi.org/10.1016/j.nedt.2022.105528>