

Brick by Brick: Exploring the Influence of LEGO SERIOUS PLAY on Master's Students' Digital Transformation Proposals

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Keywords: LEGO® SERIOUS PLAY®, Digital Transformation Education, Higher Education, Educational Innovation.

Abstract: Digital Transformation has become mandatory for the success of companies nowadays. However, some companies struggle to obtain the benefits of digital transformation, mainly because of a lack of knowledge sharing between employees to build a shared vision of the organization. So, universities must prepare people to take advantage of different technologies to become change agents in their organizations and also to be more prepared for cultural changes like knowledge sharing inside the company. To address this challenge, in 2022 we incorporated LEGO® SERIOUS PLAY® into an undergraduate course to prepare students to embrace various technologies to develop a digital transformation proposal for a real-life company. This time, we used the same activity with graduate students because they are people who work at the companies. The participants expressed enthusiasm for the activity, enabling them to share valuable insights with their peers. They also reported engaging in deep discussions and successfully constructing creative digital transformation proposals. Professors observed that both graduate and undergraduate students liked the FTCA activity, and they had an enhanced understanding of the concepts required to develop their digital transformation initiatives.

1 INTRODUCTION


Digital Transformation (DT) has become a mandatory requirement to be successful in this digital era. Today's organizations need professionals who take advantage of all the benefits of technology when applied to achieve organizational goals.


But many organizations fail to obtain the benefits of digital transformation because technology adoption alone is not enough; they also need to make cultural changes (Cox & Evans, 2020). According to Cox and Evans (2020), one of the key elements of this cultural change is the employee's knowledge sharing and ability to create a shared vision of the organization. But usually, the companies do not have the culture to share knowledge for different reasons, like the organizational structure or the lack of confidence of the employees to express their ideas. Cox and Evans propose the use of LEGO® SERIOUS PLAY® to improve the confidence of employees to share their knowledge.

To address this challenge, in 2022, we implemented the use of LEGO SERIOUS PLAY

(LSP) in an undergraduate course for senior students whose major is digital transformation. In this course, students were asked to prepare a digital transformation proposal for a real company (Lucio-Nieto, Martínez-Treviño, 2023; Lucio-Nieto, González-Bañales, 2023). In those implementations, students have found this activity highly motivating, and they perceive that it will allow them to better retain their learnings in the long term and also that they will be able to apply those learnings in real-life scenarios to facilitate the digital transformation of companies.

In those implementations, professors have observed a positive impact on the quality of student proposals when the technique of LSP is used. Professors have reported that student engagement during the activity is better than before using LSP. They have also observed during the activity that students have deep discussions on the benefits of technology implementation. Finally, the digital transformation proposals delivered by students have been well supported, demonstrating students' confidence in utilizing these new technologies Lucio-

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Nieto, Martinez-Treviño, 2023; Lucio-Nieto, Gonzalez-Bañales, 2023).

Now, we have conducted a similar experiment with Master's degree students. They were asked to make a similar project to prepare a digital transformation proposal for a real company, but these students are different from undergraduate students; they are working in different companies and are immersed in the organizational culture of each one of them, so they could be in the situation of not being confident enough to share knowledge in their workspaces, but it could also mean that they have a better understanding of what they are talking about.

When applying this activity to a graduate students' group, we were observant to find out if this activity was useful with them, who are adults and have different experiences in their companies, and if it was necessary to adapt the FTCA activity or if we could use it unchanged with the graduate students.

The objective of this paper is to present the results of applying the FTCA activity (Lucio-Nieto, Martinez-Treviño, 2023) to master's degree students and to report the differences and similarities between the two groups of students, if the activity is useful with graduate students, and if the activity had to be adjusted because of the differences among the target students.

2 REVIEW OF LITERATURE

2.1 LEGO® SERIOUS PLAY®

Lego Serious Play (LSP) is a methodology designed to enhance innovation, facilitate deeper reflection processes, and support effective dialogue between team members. In a LSP session, participants are asked to build LEGO models, which serve as a basis for discussion, knowledge sharing, problem solving, and decision-making (LEGO, 2024). LSP has been developed as a means to explore and understand complex issues that don't have a simple or obvious solution; initially, its purpose was to generate more engagement, creativity, and playfulness in company meetings (James, 2013).

The methodology asks participants to explain the meaning of their models through storytelling and a repeating sequence of active listening and expressing their own opinion about the challenge they are working with. This way, everyone's perspectives are considered when building the final proposal to solve the challenge (LEGO 2010).

LSP enables a group of people to share ideas, thoughts, and understandings so that they can engage

in meaningful dialogue and the generation of innovative solutions to real-world problems (LEGO 2010). Research has shown that the process of building something, which is then discussed, can lead to much more valuable, insightful, and honest discussions, as this process prompts the brain to work differently and unlock new perspectives (LEGO 2010).

The concept "think with the body" has gained support from psychology and neuroscience, emphasizing that some cognitive processes are strongly influenced by the way we use our bodies to interact with the physical world. Building visual reminders of the issue or the solution we are modeling with the LEGO bricks aids our mental work. In neuroscience, this is referred to as "reduction of workload" because, by having visible and tangible objects, we reduce the number of things that the brain has to deal with simultaneously (LEGO 2010).

In a LSP session, all participants have the same standing as they display their ideas through LEGO models; that is, it is not important the position in the company or the personality of each person; all participants have the same voice, giving the leaders the opportunity to listen to junior members of the team's insights that in other kinds of meetings could not be expressed (LEGO 2010). When participants make their ideas and thoughts tangible through LEGO brick models, they can reflect on their own ideas, but more importantly, they can invite others to reflect and contribute to their models. This collaborative aspect of LSP makes the activity engaging and meaningful, as everyone can contribute to making emerging ideas stronger (LEGO 2010).

LSP gives participants the freedom to present their ideas without fear of being wrong or being judged. When a participant explains his model, he gives it a meaning that the other participants accept (James, 2013).

2.2 LSP in Digital Transformation

LSP has been used in digital transformation; in their study, Cox and Evans used LSP to facilitate storytelling to enable knowledge sharing. Storytelling is a known way to share knowledge, and LSP gives the possibility to express people's ideas to all the team members, no matter their personality or their organization's position (LEGO 2010). Cox and Evans found that the LSP workshops helped to create connections between people and connected everyone in a shared vision so that they could build a concrete and collective representation of the organization's vision, with the active participation of all employees;

they found that the method effectively broke down barriers to knowledge sharing (Cox & Evans, 2020). This can be done thanks to the models they build with LSP; in this case, people are talking about the elements of the model, its benefits, and its problems, and they do not feel attacked because they are focusing on the concepts, the technology, and the risks, not the people.

2.3 LSP in Education

In addition to business, LSP has also been used in education in different subjects. For example, in a software engineering course at a higher education level, LSP was incorporated to teach software engineering principles using different development life cycle models (López-Fernández, Gordillo, Ortega, Yagüe, and Tovar, 2021). In this paper, they demonstrate the effectiveness of LSP activities, emphasizing the importance of following procedural guidelines, time management, resource allocation, and active student engagement. Students could discover the strengths and limitations of different software life cycle models through the LSP activity. Feedback from students confirmed the positive impact of LSP on their learning experiences, mentioning increased motivation, enjoyment, and the development of soft skills as well as software engineering skills. López-Fernandez et al. state that teachers can rely on this kind of activity because it has been validated with a large number of students.

Bond (2018) shares his experience of using LSP to teach referencing through a series of workshops to undergraduate and postgraduate engineering students. Students could choose to work alone or in teams to build a LEGO model that explains why they think referencing is important. They were asked to build a metaphorical model, and then a volunteer from each team explained the model to the group. According to Bond, the use of LSP allows students to be creative rather than mechanical in their understanding of referencing; students were more engaged with this activity than they had been in the rest of the class; they have been able to share their models and make connections between their own stories and those of their peers. The main outcome was that the students understood what referencing is and why it is important.

In another study (Capo-Vicedo & Mico i Tormos, 2017), LSP was implemented in the “Strategic Management in Global Environments” course of an MBA program. In this instance, MBA students and staff members from a service-oriented company worked together in teams to complete the activity.

The company used LSP to address its practical problems. The collaboration between MBA students and professionals resulted in proposals for innovative and creative strategies for the company’s digital transformation.

The use of LSP in this context created an experiential learning atmosphere, taking students out of their comfortable environment and expanding their horizons. It enhanced their collaborative and problem-solving skills (Capo-Vicedo & Mico i Tormos, 2017).

These examples highlight the effectiveness of LSP as a teaching methodology. By incorporating it, educators can create engaging and interactive learning experiences that promote creativity, collaboration, and critical thinking skills among students.

3 THE FUN-TECH AS THE CLOSING ACTIVITY (FTCA)

The activity has seven main tasks (Lucio-Nieto, Martínez-Treviño, 2023) which are summarized in Table 1.

Table 1: The FTCA Activity Steps.

<p>3.1 Initial Organization The professor gives students an executive summary of the project so that they have a clear understanding of the objectives, deliverables, and timing of the activity. The teams are created randomly and assigned to a workspace with a table and a blackboard. They receive the name of the organization they are going to work with, and they must also define their roles in the team.</p>
<p>3.2 Leader defines the problem/situation that the Digital Transformation Project will solve. Team members do quick research about the situation of the company in order to find issues that digital transformation could overcome. The leader has to agree on the scope of the project with the professor.</p>
<p>3.3 Leader organizes and the team constructs the digital transformation proposal. The leader organizes the team to work on the deliverables according to the role each one of the team members has chosen.</p>
<p>3.4 Round robin to get ideas and give feedback to other projects. Team members were able to visit other teams to listen to their projects and give feedback. This is a great opportunity to share ideas about the use of technology, implementation strategies, and paradigms.</p>
<p>3.5 Team analyzes ideas and feedback and works on the final version of the deliverables. The team integrates new ideas and feedback to improve their deliverables.</p>

3.6 Team presents video to the group and professor evaluates and gives feedback to the students.

The team uses storytelling to present the digital transformation proposal supported by a model built with LEGO bricks. They have to justify the use of each one of the chosen technologies, explaining how they create value for the organization. This presentation is made through a video. After each presentation, other teams and the professor have some time to ask questions to ensure a full understanding of the proposal.

3.7 Group celebrates achievements and lessons learned.

The professor shared personal positive conclusions, and students expressed their positive comments about the activity.

After preparing their Digital Transformation (DT) proposal, where they integrate the most suitable technologies to resolve each identified issue, the students begin a storytelling video to articulate their proposal. They present each technology as it is laid out in the LEGO model.

One team collaborated with a brewing company; their story starts with the arrival of raw materials for production. They then explain each step of the production process, pinpointing where they incorporated technology for DT. At each of these points, they describe the problem they aim to address, and the technology used to overcome it. The explanation continues throughout the entire manufacturing process, concluding when the product is loaded onto trucks for distribution.

The students' explanatory video of their DT proposal can be viewed (<https://www.youtube.com/watch?v=gHFSZ7goCYc>). In this video, they use storytelling to illustrate their proposal, which seeks to optimize the production process. They employed the Internet of Things, machine learning, and expert systems to identify, for example, production defects and take corrective action; to control product temperature throughout the process; or to enhance production floor safety. They also utilize Data Science to analyze production information and provide summarized data for decision-makers. In figure 1 an example of the LEGO bricks model can be seen.



Figure 1: An example of the DT proposal.

4 PROCEDURE

4.1 The Course

The activity was implemented in the course Digital Transformation and Disruptive Strategy, whose objective is to develop a deep understanding of applying digital transformation elements to organizational strategies. In this course, students are required to propose a transformation plan for a traditional organization to become a digital organization. This has been done through the FTCA activity. This course is part of the Business Analytics Master’s Degree.

4.2 The Group

This activity was carried out in the fall semester of 2023.

The group had 18 students. Whose age ranged according to Table 2. There were 11 men and 7 women in the group, from which 5 have studied TI majors and 10 of them have directive positions or are high-level decision makers.

Table 2: Age of the students.

Age range	Number of students
20-29	6
30-39	6
40-49	5
50	1

All of them work for transnational companies, like banks, pharmaceuticals, insurance, consumer goods, sporting goods, or technology companies.

These students are different from undergraduate students first because they have a stronger personal commitment to their studies, as they have decided to study a master’s degree, and second because they already have experience working in the industry. Even more, most of them have or are about to live the digital transformation process, whether by planning it, leading it, dealing with it, or suffering the issues related to not having a real digital transformation in their work fields.

4.3 The Activity

The FTCA activity was applied in both implementations with the same goals: students had to build a digital transformation proposal using the LSP methodology, which we expected to help them improve collaboration between team members and

make them take better ownership of the proposal ideas.

The problems students worked on were similar to those presented to the undergraduate students in the previous study, which was to design digital transformation proposals for real companies such as a supermarket, an auto parts store, and a soft drink company. Some of the teams decided to use for their project the company where some of them worked, so that they had a better perception of the company from their own point of view.

We wanted to know if any adjustments had to be made to the FTCA activity due to the students' differences.

5 RESULTS

It was found that graduate students had a good experience with the FTCA activity. They commented that they felt focused and engaged.

Professors state that they were able to foster a deeper understanding of digital transformation among the graduates' students, helping them develop innovative and practical solutions that can be implemented in real-world scenarios.

5.1 Student's Perception

At the end of the course, we asked students to answer a survey about the use of the LSP activity in the definition of the digital transformation proposal.

Even though it is expected that graduates possess advanced soft skills, including critical thinking, leadership, and project management, LSP was perceived as a good tool to communicate their ideas to the group. We asked the students explicitly, "How would you evaluate using Legos in class as a learning strategy? In the topics listed in Table 3, we used a Likert scale where 1 is "strongly disagree" and 5 is "strongly agree".

In table 3, it can be seen that all the students found that the activity was fun, made them more involved, helped them integrate the TD proposal, and would recommend using LSP again. And that most people strongly agreed or agreed with the rest of the topics, which are: organize them better as a team; be more creative and innovative; and make the TD strategy more visible.

In other survey questions, 15 out of the 16 people said that they would recommend using LSP to facilitate the definition of a digital transformation proposal. And all of them said that using LSP improves long-term understanding.

In the open-ended question, four students made comments about the benefits of thinking outside the box.

One of the students wrote, "We did things that took us completely out of our comfort zone. Tackling these new challenges with little time makes nothing as difficult as it seems. Mixing neurolearning helps retain and question ideas."

Another student wrote, "I love the mix between neuroscience and theory; there are many concepts that stayed in my head due to the activities."

Table 3: Summary of student's answer to the survey.

	Number of Strongly agree	Number of Agree	Number of Not agree nor disagree	Average	% of students that agree or strongly agree
The activity was fun	13	3	0	4.8125	100%
The activity made me get more involved	13	3	0	4.8125	100%
The activity helped us organize ourselves as a team	13	1	2	4.6875	88%
The activity helped us integrate the TD proposal	9	7	0	4.5625	100%
The activity helped us to be more creative and innovative	12	3	1	4.6875	93%
The activity made it easier for us to make the TD strategy more visible	10	4	2	4.5	88%
I recommend using it again	11	5	0	4.6875	100%

In general, students said that it was better for them to solve this project using LSP. They said that they had never thought that designing a business proposal with LEGOs would make the ideas clearer in their minds. Even though they have experience working in a company, they found the methodology helped them to be more focused, to make the ideas clearer, to be more creative, and to better understand other people’s ideas.

5.2 Comparison of the Opinion of Undergraduate and Graduate Students in This Activity

The experience with the undergraduate students was carried out in the fall semester of 2022 in a group of 27 students, from which 24 students answered the survey (Lucio-Nieto, Martinez-Treviño, 2023), and the experience with graduate students was carried out in the fall semester of 2023 in a group of 18 students, from which 16 students answered the survey (see table 4).

Table 4: Information of the groups.

	Undergraduate students	Graduate students
semester	fall 2022	fall 2023
number of students in the group	27	18
number of students answering the survey	24	16

The same survey was applied in both groups, in which a Likert scale was used, where 1 means strongly disagree and 5 means strongly agree. Table 5 shows the average of the responses of students and the percentage of students who answered 4 or 5 (agree or strongly agree).

As can be seen in Table 5, the perceptions of undergraduate and graduate students are very similar. The biggest difference is that more undergraduate students perceive that the LSP activity helped them to make the strategy more visible and to organize better as a team.

Those differences could be because of the more experience that the graduate students have in the DT topics.

5.3 Professor Observations and Discussion

The undergraduate students and the graduate students have important differences.

The undergraduate students are younger; most of them are under 23 years old. They are brave enough to make proposals despite not fully understanding what they are talking about. They focus on short-term professional goals and are living la vida loca. They have been developing soft skills through the university courses.

On the other hand, graduate students are adults that have experience in their jobs; all of them work for world-class companies, so they are conscious of what digital transformation means for an organization; they tend to exhibit a more calculated approach to academic and career decisions, considering long-term goals; they are expected to have more advanced soft skills, including critical thinking, leadership, and project management; and 55% of the students have directive positions or are high-level decision-makers in their companies.

With the undergraduate student group, instructors had to be closely following the work; they had to ask questions and give advice to guide students in the right direction. When the FTCA activity was applied for the first time (Lucio-Nieto, Martinez-Treviño, 2023), it was necessary to extend the time so that students could finish the DT proposal. The activity was thought to last 4 hours, but it has been extended to 6 hours.

With the graduate student group, instructors didn't have to follow them too much; they finished the activity within the 4 hours planned.

Instructors observed that graduate students already had their own ideas about DT and already knew how to collaborate, but despite having experience, especially with the soft skills, the activity helped them to communicate better and deeper with their peers. Graduate students used time more effectively, focused better, and had a better understanding of the expected outcomes of the project. When students went with other teams to make the round-robin step, it was easy for them to understand the ideas; they were more focused, and when they gave their opinion, it was not only about what they saw in the models but also about what they knew from experience in real-life projects. The professor observed that graduate students took better advantage of the contributions of their peers, mainly because most of them have already lived them or even implemented them, but also because contributions were more focused and accurate; they also understood better the peers comments and could use them to improve their own proposals.

The main benefit for those students who have already worked on DT proposals was that they had lived it this time through the FTCA activity; as they

Table 5: Comparison of the graduate and undergraduate’s students’ perception.

	Graduate students (fall 2023)		Undergraduate students (fall 2022)		Difference between undergraduate and graduate students perception	
	Average	% of students with strongly agree or agree	Average	% of students with strongly agree or agree	Average	% of students with strongly agree or agree
The activity was fun	4.8125	100%	4.9167	100%	0.1042	0%
The activity made me get more involved	4.8125	100%	4.6667	96%	-0.1458	-4%
The activity helped us organize ourselves as a team	4.6875	88%	4.75	96%	0.0625	8%
The activity helped us integrate the TD proposal	4.5625	100%	4.8333	96%	0.2708	-4%
The activity helped us to be more creative and innovative	4.6875	93%	4.9583	100%	0.2708	7%
The activity made it easier for us to make the TD strategy more visible	4.5	88%	4.8333	100%	0.3333	12%
I recommend using it again	4.6875	100%	4.8333	96%	0.1458	-4%

commented in the final feedback of the course, they appreciated the way this activity helped them understand and communicate better their ideas. This way, we concluded that the FTCA activity didn’t need any changes to be applied to graduate students.

4 CONCLUSIONS

We have used LSP with storytelling as a tool to promote creativity and innovation and to encourage deeper discussions to build a proposal to implement a digital transformation strategy in a company. We have found that this methodology serves both undergraduate students, who are just learning, and graduate students, who want to learn more and want to explore different approaches. We realized that we don’t need to modify the FTCA for graduate students; as they expressed, they appreciate the value of the activity in their learning process.

One of the main problems that face companies when trying to implement a digital transformation strategy is that people do not always share their ideas well, so we propose LSP with storytelling as a tool to define requirements, understand problems, and create innovative solutions to real-life company challenges. We encourage adults to use it and come up with fun ways to do a better, much more effective job.

Age, maturity, and experience are not significant factors in having fun learning through LSP, collaborating with multidisciplinary teams, and developing proposals that transform organizations. Watching the ideas in colors, bricks, and models made students have a greater awareness of what they wanted to implement; it is not an idea in the air; it is a brick, a color, an activity, or a technology. This made it easier for them to take ownership of the ideas while talking about them using storytelling, and this generated a greater awareness of the impact of what they were designing.

This is an empirical application that could be validated with different metrics on effectiveness that will be addressed in future work.

Another future work idea is to apply a specific soft skills survey before and after the activity to confirm that this methodology can help people develop soft skills.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the financial and technical support of Writing Lab, Institute for the Future of Education, Tecnológico de Monterrey, Mexico, in the production of this work.

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