Making Learning Engaging Through Interactive Games

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Now, moving on to another example, this is a paper by Xiong and Ng, Application of Educational Game to Enhance Student Learning. So, here I am going to give again a snippet from the article or paper. Sometimes you may find some of these things repeating but it's also to emphasize that these are the vital ingredients of learning. The idea behind quoting all of these papers is to actually emphasize the fact that learning needs to be enjoyable and relaxing. A lot of learning environments are not conducive because of exam related stress or portions to be completed and game takes away that that stressfulness that is there in the atmosphere. So, as the student quotes, it allows me to revise in a relaxing way unlike how I normally revise which I just try to remember everything.

So, while preparing for exams, you just try to mug up facts or you try to study and try to remember. A game tends to give prompts and as you solve and when there are repetitive questions in different forms, the same exact objective is achieved but in a relaxing context. So, this is one quote. Okay, here they have played a game called Pagamo but we will not go into that.

But let us look at the motives and what makes it really conducive for the student. So, that is an interesting list to see. Fun of course, self-learning. Self-learning is essential. We said there is a material-based learning, the faculty-based learning, peer learning and self-reflection and learning.

So, the self-learning is a key component. The third one is want to get a higher grade in the final examination. So, there is a motivational driver there. I mean everybody wants to excel. That nature is there.

We want challenges. All of us want to be challenged and a game provides that challenging environment for the students. And it is not only wanting to get a higher grade in the final exam, wanting to score higher in the game. So that virtual feeling of

win, wanting to beat others and win, but in a healthy context, not as we discussed before, wanting to score higher in an exam causes pressure because of the association of importance to the exam. But in a game, the same exact thing is done in a healthier environment.

Of course, the enjoyment and pleasure in winning points, defeating the opponents, scoring and those other motivational elements. The choice of play. See, I can choose when to play. We all want this choice. If we are forced to play also, that's a problem.

I mean, humans don't like being forced on anything. So, there has to be a choice. The kind of play and when to play, when to study, whom to play with, all those cannot be forced. Self-achievement, yes, as you play, your sense of achievement in terms of the points or the win state in the game. And 9 is somewhat like repetition, but essentially the wanting to win.

It's very correlated to 5. The last but probably the most important one, we are not talking about entertainment games, we are talking about the learning provided by the game. So, if the game has a very high relevance to my learning, those are the games that we want in teaching learning context and if you are able to blend fun, motivation, along with the learning, then that is the real success. Now, I am trying to see different examples, different age groups and different countries and probably different socio-economic groups also. So, here is a case study of early maths low income group.

And this is very interesting, we will see the details of the same. So, in Brazil, they did the study of around close to 3000 first grade students across 267 classrooms in 132 schools. That is quite a comprehensive list, a lot of schools, lot of classrooms and lot of students. and about close to about 47% of the students who installed and used the applications. Now, in the experimental group who played this Escribo play, they advanced 2.

27 times more than the increase of the control group for number identification, 2.78 times more in the count sequence, and 1.73 times more in the geometric shape and 1.41 times more in the spatial sense. So, there are four aspects of it that has been measured and all of them have shown significant improvements in the control group that has played the games.

So, the reasons once again is attributed to the interactive nature which seems to be missing in traditional classrooms unless of course the teacher consciously tries to bring that element in and of course teachers they they are time constrained and it takes a lot of preparation to bring in the interactivity if each teacher has to do on their own so it's better

to leverage pre-built games or design games so that it automatically brings that interactivity nature in. So, once again, they have talked about animation and games. And essentially, it talks about the interactive nature, evidence-based instructional strategies with engaging and interactive content. and easy to use applications. And the next example is about high school chemistry periodic table topic.

This is related to development and usage of UNO chemical card game as a learning medium for helping out students in periodic system of elements. So, here are some observations from the paper. Once again, they quote, games advantage in students' active participation in learning. So, again the interest aspect is highlighted. The other aspect is leveraging games from everyday games that students play.

See, today there is a lot of emphasis on developing hi-fi animation, AR, VR and all those little more sophisticated kind of games, wherever technology supports it wherever costs and budget support it, certainly they can be enabled. But I wanted to emphasize one learning from this, it's everyday card games seem to, everyday regular usage board and card games seem to provide that exact same benefit because there is not much of a learning curve there. This is not talking against the new tech games, but both have their applicability. If we are able to adapt existing game that students play in their day-to-day lives and map it to a context of learning, the learning curve for the students become very less and probably even for the teacher. So, that is the point that comes out as a highlight for me from this paper.

And because it's an Uno game which is very very popular, so it's easy for the teacher and student. And let's see what the teachers and students have had to say. Very high results in terms of ease of use, benefits and attractiveness. So, this is very essential. The game should be easily adaptable and usable, beneficial and reasonably designed attractively for the learners to engage.

Now, here is another topic. See, we saw chemistry, maths, now it's physics. And this is about physics and astronomy using a board game. Here, once again, it's very, very simple. A dice rolling board game for engaging students in astronomy and physics.

All of us are familiar with very simple board games where you roll the die and move around and you encounter different situations, questions, etc which you answer. So, again a very simple methodology has been used. Now, let's look at the student evaluation of the different aspects of the game. The topics discussed were interesting, 80%. The questions were easy to understand.

Here, probably it needed a little more work on the game, probably. As we talk about the

skill challenge match, that probably needed to be designed a little better. But if that was adjusted, probably that second parameter would have scored better, but that's a learning of actually trying out a game and not every game experiment works perfectly. So, it's an opportunity for learning. The third aspect, I enjoyed discussing this topic with my classmates.

Once again, re-emphasizing in the game context, when you are with your classmates, it makes it so much more enjoyable and that environment is not somehow provided in a typical lecture-based one-to-many context. So, incorporating games at least periodically helps bring in that environment. And it's not just about the game. The next topic, the next aspect talks about we were given enough time for discussion. So, it's not just a Question of letting the students play the game.

Both during the game and post the game, there has to be enough time for discussion on the topic because that's where the real learning happens. Interactivity between the students and the student groups with the teacher is what enables the learning and in this case, sufficient time has been given. The facilitators encouraged participation. Yes, this is something again very vital as we have always been discussing. It should not be taken as an intervention where you allocate a small time segment of the class and in the interest to complete portions, one should come back to the typical way of teaching.

Even if we do small amounts of interventions using game-based learning, let there be adequate time for whatever they choose to do and also encourage participation. So, that really encourages the students and gives them a fuller sense of learning. The next aspect is, I got a chance to have my say. So, all of these may seem correlated, but yes, they are, but there are differences. How many of us teachers would like to have participation from every student in the class? Isn't it a dream for every teacher if every child actively participates and gets to have a say? We have seen before that the classroom setting is a little scary, in fact a lot scary.

Not just for children, even for adult learners, because there is the psychological sense of what if I go wrong? So, all our interest should be in creating that kind of a classroom and an environment, learning environment where everybody gets a chance to speak up and games provide that. As we discussed, games when they get played in smaller group settings, everybody gets a chance to speak, at least in the smaller group. Everybody's voice is heard, at least among the children and probably there could be a group collator of ideas, but you could see everybody speaking up in a game or in the small group settings. Now, even if it is not a game, the close group discussions facilitated in the classroom could serve as ideal examples for enabling this, maybe a 2 to 3 member student discussion group or a 4 to 5 member student discussion group as the case may be,

facilitates this. The last one is, I felt I was listened to.

All of us want to speak or rather have our opinion heard. We want to speak up, we also want to be listened to. There has to be a real acknowledgement of what we have to say. So, this is a very crucial dimension. More than what is being taught, more than how the students learn, I think if this classroom environment can provide these two settings, the students will be self-motivated to learn on their own.

And in a game context, in a game-based learning context, if game is used as a toolkit for facilitating this and it does help in achieving that, nothing like it. This chart is about perceived complexity, attractiveness of the game, ease of use and playfulness. Here, of course, some parameters can be improved. It is a reflection. For the game designer, it is an iterative experiment.

The game seems to be scoring well on the attractiveness and playfulness, but there is scope for improvement on the other aspects. Now, here is the teacher's evaluation of the different aspects of the game. Of course, teachers have their own say in terms of difficulty of the questions, ease of use, playfulness, usability of the game and whether it stimulates discussion and whether they recommend for other teachers. Now, this is also very essential. So, this is probably designed by one or two teachers or maybe a couple of teachers and it is being circulated to other teachers.

So, having a peer review and peer, student review is important, a teacher's perspective is equally important and all these provide useful metrics in improvising the game. So, game applicability for the teaching of astronomy, here going by the scales, good, very good and excellent are in the different shades of blue and for most parameters possibly accepting formative assessment, even formative assessment scores reasonably high, this game seems to have fared well. Okay, here is another completely different topic. I am trying to correlate examples from different disciplines. We saw different branches of science, we saw maths and now what about law? Here is an example of professors using board games, specifically Monopoly board games adapted once to teach law, property law and constitution.

So, number one, it makes the teachers creative and students also get that environment of peer learning and fun. But I wanted to specifically highlight that it can be applicable for all fields. And law, people may have some opinions. Again, law, medicine.

I mean, there are some biases. Even for that matter, I would say even science and maths, right? Different teachers hold on to views that certain things have to be taught the serious way. These are examples where, yes, every field is open to creativity, every field has

similar challenges, teaching learning challenges and games are something to be considered to provide that environment of fun-filled learning. Here again, it highlights game-based learning is not new. Learning is already a core component of most games. See, the author says that chess teaches us strategy, puzzles teach us problem solving, multiplayer games teach us collaboration.

All these are generic games, right? And we know role play games. All of these games inherently come with some kind of a learning. But if they are adapted in the specific learning context, like in the case of law, how they have adapted the monopoly game to teaching law, it adds that extra context and relevant context to the teaching learning process. Thank you.