

Playing Through Project-Based Learning within a Digital Blended Learning Model

Literature Review

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Introduction

The brain loves to play. Fueled by dopamine surges, cognition and memory increase as the brain engages in “learning mode”. What if that natural inclination was incorporated differently in our educational environment that benefited the student, and made facilitating learning more efficient for the educator? The use of a project-based learning model combined with the power of a digital blended learning environment has the potential to harness the brain’s intrinsic love of play through novelty and discovery that leads to increased learning beyond the four walls of a physical classroom setting when paired with purposeful planning and skill teachers facilitating the learning along the way (Ginsburg, 2007; Mehta et al., 2020). This literature review will explore the power of play, project-based learning, digital blended learning environments, and some cautions.

Power of Play

What exactly is the power of play on student learning? Most knowledge of how the brain responds to play comes from the foundational research done by psychologists Jean Piaget and Lev Vygotsky. Current research builds on their foundational findings and claims that play is fundamental to development and contributes to emotional, social, cognitive, and physical development (Henricks, 2020). The benefits of play extend long past childhood and youth, continuing into adulthood. However, despite all the well-known benefits of play, there has been a notable decrease in play for children with adverse outcomes in multiple areas of child development due to increased structured activities and academic demands placed on families (Ginsburg, 2007).

According to Gray, “Curiosity is how children acquire knowledge, play is how they acquire skills. Children like adults are social beings. They have language and they learn by playing at activities that are important. An example of children learning through curiosity and play is language. Children are not directly instructed on language, they are curious about it and then play with sounds and words until they learn what is needed to communicate.” (Gray, 2013).

Play has the unique ability for the individual to remain autonomous, yet connected at the same time. It does not simply mean unstructured, free play aka “recess style”, although that has its place of importance. Play, reframes problems into challenges to be solved. Play is creation. Play is self-directed and personal. Play is connecting the dots and making meaning. Our brain is hardwired to learn through play: exploration, novelty, creation, and making meaning. Novelty, seeing and acknowledging “new”, triggers our memory into “remembering”. There are many different ways our brain likes to play. Current research continues exploring the “pathways of experience” our brain engages in through play that leads to dopamine and turns on our “learning” mode (Henricks, 2020).

How does play apply to project-based learning within a blended learning classroom environment? Let’s explore the play of puzzling. Puzzling differs in that it has “external logics, correct endpoints,... and discovery rather than creation.” (Henricks, 2022).

Puzzles offer a fixed solution, yet the puzzler is required to sort through the information, solve the challenge of connecting the pieces which leads to the final discovery of the desired outcome with the feeling of satisfaction. There is instant feedback if something

is correct or incorrect, and yet the timing and the approach are completely in the hands of the puzzler-not the puzzle itself.

Play and technology have a complicated relationship. (Mehta et al., 2020). Mehta points to the research of Dr. Gray which states the following:

Thus, some opportunities to play on screen can lead to very highly creative activities, while others may not. Dr. Gray directs our attention to existing new literacy practices of preteens and younger children who are using internet-based communication services, such as social media and instant messaging, to collaborate and share ideas. Dr. Gray suggests that in any situation, it is better for children to play with each other than not. Thus, these communication channels allow them to play in new ways and think of creative things we have not considered yet.

Discussing the studies that showed correlations between video games screen time and Torrance Tests of Creative Thinking scores, Dr. Gray addressed parents' general concerns:

So many adults have this view that kids' minds are rotting because they're sitting there in front of the screen. Quite the opposite. They're becoming creative. There's also, by the way, a positive correlation between hours played on video games and IQ scores. And there's a lot of research showing cognitive strengthening as a result of playing video games.

According to Dr. Gray, while schools are assigning non-creative work to students, video games have been a saving grace for children, allowing them to play and be creative in ways that are in their control. Video games are not the only creative outlets in digital realms. Dr. Gray argues that technology in general is freeing up people to play, follow curiosities to do things that they like and want to master. With more automation, the need for monotonous and non-creative jobs may decline, leaving people free to create and pursue passions. (Mehta et al., 2020).

Power of Project-Based Learning

Project-based learning (PBL) is an instructional design that bases student learning of knowledge and skills through real-world challenges and personally meaningful projects. What distinguishes project-based learning from other student center teaching approaches is the culmination of learning in a project or presentation. Some common traits among the different types of project-based learning are designed around a real-world problem/issue and then follow inquiry and curricular integration. The problem is then solved and shared via a product or presentation (Nollmeyer & Torres, 2022).

The research shows that project-based learning, with provided learner-centered scaffolds, establishes successful learning in academic settings. "PBL...enhances students' experience in autonomy and competence by providing multiple types of scaffolding in accordance with students' different needs and difficulties...students can

control the nature and frequency of scaffolding by themselves according to their needs and ability, and it plays a role in improving their self-directed learning skills. Last, peer scaffolding between students with similar abilities satisfies students' needs for relatedness." (Kim & Axelrod, 2019).

PBL is effective no matter the duration of time, location, or population of learners. A recent investigation by Karjick, Schneider, Miller, Chen, Bradford, Baker, and Peek-Brown studied the effects of Multiple Literacies in Project-Based Learning science intervention in 4 science units with a cluster randomized control group of 3rd graders from 46 Michigan schools. It showed that those students who received the intervention had higher scores on a standardized test (0.277 standard deviations) than those who did not. Additionally, the students reported higher levels of self-reflection and collaboration. (Karjick et al., 2023).

Robert Marzano, who studies pedagogical strategies, started calling for an instructional shift in 2014. He and his colleague, Michael D. Toth, reported "We see teachers working much harder than their students" (Marzano & Toth, 2014). The traditional pedagogical model of teacher-centered instruction emphasizing lecture, practice, and review no longer is effective. They reported that "this is not a pedagogy...that will help students succeed with the new standards' and is more likely to result in "teacher burnout and student fatigue" (Marzano & Toth, 2014). They proposed a shift to student-centered learning for all to be more successful. They stated that "teachers need models and training to help them step back to the role of skilled facilitators, to guide students to take

ownership of their own learning. The teacher's role here is to equip students...to use their knowledge, to put it to work on solving problems, not to simply recall it in some fashion without elaboration" (Marzano & Toth, 2014).

How are teachers going to find the time to learn and implement project-based learning? One possible solution is shown in a study done by Dunbar and Yadav in 2022 looking at a multiple case study in middle school summer school in a diverse, urban, school district. Incorporating project-based and service-based learning during summer school allowed the teachers to overcome previous biases and challenges surrounding this student-centered learning approach. This opportunity allowed teachers to practice shifting control of learning to students in real-time, allowing for a transition to project-based learning with peer support. Even in this short time, teachers were able to learn how to effectively shift from a teacher-directed to a more learner-centered, project-based approach (Dunbar & Yadav, 2022).

Project-based learning requires safe and collaborative culture, effective teachers, timely feedback, a guaranteed, viable curriculum, and standards-based reporting. Leadership is crucial at the campus level to ensure positive student achievement. The administrators must support instructional leadership by supporting teacher development, establishing goals, overseeing curriculum, aligning resources, and guaranteeing a supportive school climate. (Johnson et al., 2017)

Project-based learning fits well with the constructivist approach, defined by John Dewey, and is widely advocated for our learners to succeed in our current post-COVID educational climate but has yet to replace the long antiquated factory model system that remains in place throughout our educational system (Roberston, 2022). Constructivism itself is a meaning-making theory where students become involved in their learning. People construct their understanding based on their experiences (Skeen, 2014).

Project-based learning also fits well in support of play. According to the research done by Mehta (2020), they found:

...curiosity, play and sociability are three natural drives that are inherently educational. This does not mean, however, that these impulses are all powerful. These drives, he argues, can be suppressed if the freedom to thrive is not allowed. Like fire, these drives need freedom to breathe and burn, and are extinguished by limitations and oppression. But they also need to be guided and framed into constructive explorations through collaborating, tinkering, playing, and problem solving. (Mehta, 2020).

Power of Digital Blended Learning

We live in a world that relies heavily on digital tools. It is no shock that digital tools and how to incorporate them have become a focus in teaching and learning. (Marin & Castaneda, 2023)

Educational technology offers the unique ability to enhance delivery and personalize instruction. (Ross, 2020) There is a great opportunity created for educators today to develop the thought of technology as an educational tool and delivery system versus a “treatment” or a reward. For continued effective and sustainable educational technology use, clear learning outcomes must first be defined. Communicating what the technology will and will not promote also needs clear communication Technology is the tool to help with the delivery and subsequent learning. (Ross, 2020)

Alan November, a long-time digital learning expert, asks a great question which is also the title of his book “Who Owns the Learning?”. Students need to own their learning, take initiative and learn how to safely navigate their digital environment. He outlines “...a number of ideas for creating learning experiences that engage students by enabling them to contribute to the curriculum as well as to their community at large, and in the process, develop essential skills in problem-solving, critical thinking, creative collaboration, and global communication.” (November, 2012). He refers to his approach as the “Digital Learning Farm”, based on historic family farms where children were an essential part for the survival of the family, and by necessity, children were essential teacher helpers in one-room schools (November, 2012, p.12). When our current model of instruction became standard, graded classrooms is when we lost the value of children as contributors to their learning. He argues that with technology integrated into the classroom, the “dignity and integrity of a work ethic with redefining the role of the learner as a contributor” is restored. He cautions that the focus should not be on the technology itself, or it just becomes a “thousand-dollar pencil”, giving the example of

seeing technology used to simply memorize the names of state capitals vs. building interactive digital maps of the history of state capitals (November, 2014, p. 14).

The focus shifts from delivering information to how the learner interacts with information.

As stated below:

“We don't need people working on assembly lines anymore. We don't need people punching numbers. We need people to do creative things. So, I think our lesson from technology is that we can allow ourselves, we can allow our children to do creative things and not force them to do all these non-creative things that are no longer necessary because technology has made them no longer necessary.” (Mehta et al., 2020).

This shift in student interaction and use of information easily lends itself to the blended learning model. What exactly is blended learning? For this review, the following definition is used:

“The definition of blended learning is a formal education program in which a student learns:

1. at least in part through online learning, with some element of student control over time, place, path, and/or pace;
2. at least in part in a supervised brick-and-mortar location away from home;

3. and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

Most blended-learning programs resemble one of four models: Rotation, Flex, A La Carte, and Enriched Virtual. The Rotation model includes four sub-models: Station Rotation, Lab Rotation, Flipped Classroom, and Individual Rotation.”
(Horn & Staker, 2014)

The most misunderstood concept related to blended learning is to confuse it with “technology-rich instruction”. True blended learning is more than just using digital tools. Blended learning includes online learning with “some element of student control of time, place, path, and/or pace”. If any of those elements are missing, it is not blended learning. (Horn & Staker, 2014)

Blended learning's intent is to be student-centered, as with project-based learning. Student-centered design is crucial for successful engagement and motivation. When educational teams design a blended learning experience without students at the center, it doesn't work as well (Horn & Staker, 2014). Students want to feel successful and have fun. With blended learning models, teachers can transform the traditional factory model and actually incorporate the pedagogical teaching strategies from Marzano (2014) and capitalize on Hattie's greatest influences by creating a classroom environment optimized for self-efficacy (.92 effect size) to help create positive relationships (0.53 effect size), a collaborative experience (0.55 effect size) and have

time to provide meaningful feedback in a timely manner (0.7 effect size). (Hattie & Waack, 2018)

Additionally, the digital tools utilized in a blended learning classroom environment allow for the creative play our brain needs to learn that applies beyond the classroom. Mehta reports:

...the drives of play, curiosity and sociability have become the fuel for our lifelong self-directed learning. Curiosity and play drove humanity to manipulate nature to its advantage, to create tools from it and from them more tools. These tools and technologies have become advanced enough to soon reach a point when extant social beliefs that promote non-creative, non-critical, mechanical, standardized, and homogenized policies and practices may make room for curiosity and play to drive learning—for creativity to flourish. (Mehta, 2020)

Cautions

Despite the benefits that digital tools used in a blended learning environment provide, there are a few things to keep in mind, especially as new information surfaces regarding negative health effects in relation to passive screen time. Amanda Strom's article, "The Negative Effects of Technology for Students and Educators" (2021) determined technology could impair student learning when overused due to lack of timely technology training and support for educators combined with the pressure to incorporate technology into the classroom. As Gray was quoted:

"the screen is a platform for all kinds of things." He suggests that digital tools are protean and like any other educational tool or setting, they can both provide or detract from creative possibilities. Thus, some opportunities to play on screen can lead to very highly creative activities, while others may not. (Gray, as cited in Mehta et al., 2020)

There are negative behavioral, cognitive, and social implications to screen time exposure that must be considered.

Also, technology is not a treatment for current classroom woes, nor is it meant to be used passively. A classroom can be technology-rich, but merely substituting a digital tool does not equate blended learning. John Hattie's research also supports that technology or a digital tool, such as PowerPoint, in and of itself does not have a significant effect size on learning, but when paired with purposeful pedagogical planning, such as micro lesson using video as a review, can have an effect size up to .88 (Hattie & Waack, 2018).

Conclusion

In conclusion, incorporating project-based learning (PBL) within a digital blended learning environment holds immense potential for enhancing education by leveraging the brain's natural inclination for play, novelty, and discovery. Play is fundamental to development, contributing to emotional, physical, social, and cognitive growth. By reframing education as a puzzle, where learners assemble multiple skills and concepts

to achieve desired outcomes, PBL shifts the focus from memorization to active problem-solving and empowers students to take ownership of their learning.

Integrating digital tools within a blended learning framework further enhances educational delivery and personalization. Blended learning models, designed with a student-centered approach, optimize engagement, motivation, and learning outcomes while also allowing the important aspects of play needed for natural learning to occur.

It is important to acknowledge the cautions associated with technology use and potential misuse, including the recently reported negative health effects of excessive screen time and the need for proper training and support for educators. Technology should not be seen as a magic wand, but as a tool to enhance learning experiences when integrated with purposeful pedagogical planning.

Ultimately, by embracing project-based learning and digital blended learning, the educational paradigm can shift from outdated factory models to constructivist approaches, prioritizing student agency and facilitating successful learning outcomes in our evolving digital era.

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