

CREATIVE SPACES TO DEVELOP DIGITAL COMPETENCE: CHALLENGES IN A UNIVERSITY COURSE

Séverine Parent

Department of Education, Université du Québec à Rimouski (Canada)

Abstract

In the province of Quebec, Canada, the government has published a Digital Action Plan (MEES, 2018) aimed at integrating and leveraging digital technology for the success of all students and citizens. The Plan identifies creative labs as one of the global trends in education. Inspired by third places (Oldenburg, 1999; Tremblay et Krauss, 2019) and makerspaces (Hatch, 2014), creative spaces allow people to make, transform, and equip themselves, as well as participate, share, and learn. These actions support the democratizing effect of the maker movement (Hatch, 2014) as well as the development of people's agency (Blikstein, 2013).

In the wake of the Plan, the government released a Digital Competency Framework (MEES, 2019), a local way of interpreting 21st century skills. The Framework identifies dimensions deemed essential to learning and growing in the 21st century for students and faculty members (MEES, 2019). This competency has quickly found its place in the "Competency Referential for the Teaching Profession."

In order to train future teachers, a course was developed in the bachelor's degree in primary education in Quebec, allowing students to address dimensions of the competency that were previously absent from their training. Thus, the course "Creative Technologies and Networked Learning in Education" is in line with the Plan, which emphasizes that the educational system must ensure the development of the competencies essential to tomorrow's citizens.

The focus of the course is the purpose and possibilities of creative spaces. One of the issues that quickly became apparent was the challenge of fitting the creative space and its informal learning into the formal context of an educational program. In its reflective aspect, the course addressed pedagogical innovation. The presentation will relate how twenty students negotiated a collective definition of pedagogical innovation. On a practical level, networked learning was at the heart of the actions and projects. Particular attention was paid to the production of pedagogical objects or the improvement of educational processes. Creative spaces, their tools or ways of doing things, were at the heart of the course activity. Thus, activities such as visits of creative spaces and the exploration of virtual reality supported an ambitious collaborative production project with sixth-grade students. The paper will provide an opportunity to recount, in an autopraxeological way (St-Arnaud, 2003), the experience of the first iteration of a course on pedagogical innovation that focused on the integration of creative spaces.

Keywords: *Creative space, digital literacy, university, education, innovation.*

1. Introduction

Recently, in the province of Quebec, Canada, the government released a digital action plan (Plan d'action numérique) (MEES, 2018) aimed at effective integration and optimal exploitation of digital for the success of all people. The Plan identifies creative labs as one of the global trends in the integration of digital tools in educational systems and provides directions for integrating and valuing them in teaching and learning. The Plan is accompanied by financial measures deployed over several years, and creative spaces will be an increasingly important part of the province's educational landscape—as they are in other provinces in Canada, such as New Brunswick.

2. Concepts

2.1. Makerspaces

Creative spaces allow users to craft, transform and equip themselves, as well as participate, share and learn. These actions enhance the democratization effect of the maker movement (Hatch, 2014) and the development of the empowerment made possible in creative spaces (Blikstein, 2013; Davidson and Duponsel, 2021). A makerspace is a "collaborative work space inside a school, library or separate

public/private facility for making, learning, exploring and sharing that uses high tech to no tech tools” (makerspaces.com, s. d.). It is the maker’s mindset of creating something out of nothing and exploring one’s own interests that is at the heart of a makerspace.

For several years, creative spaces and digital fabrication have been envisioned as an unprecedented opportunity for educators to advance a progressive educational agenda in which project-based, interest-driven, student-centered learning are at the center stage of students’ educational experiences (Blikstein & Krannich, 2013). These spaces were identified in the 2015 and 2016 Horizon Report as trends to watch in education (Educause, 2020). Creative space initiatives, often modest, are emerging in educational institutions, alongside larger scale makerspace in libraries, community centers, or museums. While bridges can be built between these two realities, they do not have the same goals. While educational settings must deal with a government-defined curriculum, creative spaces in public places are more supportive of informal and non-formal learning. When these environments come together or meet, tensions in their systems of activity can arise (Parent & Lord, 2022). In recent years, initiatives have been developed to adapt makerspaces to the formal education context, building on the strengths of this environment, notably with the Learning Lab initiative, a place and ecosystem for experimentation and innovation in new forms of collaborative work and learning. These innovative collaborative spaces simultaneously use digital tools, environments, equipment, learning materials and pedagogical methods that promote collective intelligence (Learning Lab Networks, n.d.).

2.2. Digital competence

The government has also published a Digital Competency Framework (MEES, 2019), a local way of interpreting so-called 21st century skills. Digital competence is a set of skills related to confident, critical and creative use of digital technology to achieve goals related to learning, work, leisure, inclusion in or participation in society. This competency encompasses the dimensions deemed essential for learning and growing in the 21st century for both the student population and faculty/professional staff (MEES, 2019). Competence quickly found its place in the “Référentiel de la compétence de la profession enseignante.” It is identified as cross-cutting, since it is deployed across the various fields of intervention, as well as in teachers’ activities and work situations. Since 2020, teachers have been invited to mobilize digital technology (MEES, 2020). However, the competency does not appear in the student training program.

Pre-service education has therefore adapted to integrate the new framework into teacher training. To prepare future preschool and elementary school teachers, a course has been developed in a bachelor’s degree program offered in initial training in a Quebec university. The course allows students to address dimensions of competence that were previously absent from their training. Thus, the “Creative Technologies and Networked Learning in Education” course is in line with the Plan, which emphasizes that the education system must ensure the development of skills and the acquisition of knowledge essential to the training of today’s students, as well as tomorrow’s citizens, who will be free, creative, responsible, autonomous, critical thinkers, and capable of communicating and collaborating in a constantly changing world (MEES, 2018).

3. Objectives

The focus of the course is to use and learn to integrate innovative technologies into teaching and learning, and to build and mobilize a learning network. The focus of the course is the purpose and possibilities of creative spaces. In its reflective aspect, the course addressed pedagogical innovation. On a practical level, makerspace and networked learning was at the heart of the actions and projects.

From the beginning of the integration of the maker approach in classrooms, challenges have been identified: how to make sense of this learning, what to do if students do not want to create or share, what happens if it does not work? (Hira, Joslyn & Hynes, 2014) There is no single answer and the solutions must be adapted to the context in which the projects are carried out. This is the purpose of our initiative. In our context, one of the issues that quickly became apparent was the challenge of fitting the creative space and its informal learning into the formal context of an educational program. More specifically: how to integrate the creative space and its philosophy into a formal educational context?

4. Methods

We share the first iteration of a course on pedagogical innovation based on the integration of creative labs. The students (19 girls and 1 boy) took the course in the winter of 2022. The course was offered in the final semester of a four-year bachelor’s degree leading to the Early Childhood Education and Elementary Teaching Certificate required to be legally qualified to teach in Quebec. For the first project (p1P), they were paired with students from a grade six class (11–12 years old) in downtown

Quebec City. Three university professors, a teacher, a project manager and guest educational consultants were involved in this project. The second project was done in class at the university.

The paper will provide an opportunity to relate, in an autopraxeological way (St-Arnaud, 2003), the experience of the first iteration of a course on pedagogical innovation that focused on the integration of creative spaces according to the experience of one of the university teachers involved in the project. In a self-referential approach, the sequence of events is described and interpreted and theoretical links are proposed. This allows researchers who take an autopraxeological approach to develop generic knowledge that can be activated in other contexts (Albert & Michaud, 2016). As a complement, the end-of-course evaluation questionnaire completes the look of the learning experience.

5. Findings

Activities such as visits to creative spaces, meetings with fabmanagers, and exploration of tools such as virtual reality were offered to students. Three main projects were conducted: reflection on the learning journey in a creative space, a collaborative project with students in a 6th grade class, and the development of a collective negotiated definition in a knowledge forum. We will focus on the last two projects. The next few paragraphs will describe the objectives and progress of the projects.

5.1. Project: Primary-university first peoples (p1P)

The First Peoples Project (p1P) is a project carried out with the university students of the course and the students of a 6th grade class. This project, part of a research project, aimed to develop knowledge of the uses of digital technology likely to foster educational success, based on the establishment of a partnership between the educational research and teaching practice communities. On the university side, the project aimed to support the development of the dimensions of digital competence of university students. On the primary school side, the pedagogical objective was to support students' learning in the social world, particularly in terms of their understanding and awareness of the realities of the first Aboriginal peoples.

First, the elementary students documented the reality of the First Peoples. Then, individually, each student chose a topic on which he or she did research. The university students were invited to suggest ways to highlight the results of the research by using digital technology. They prepared presentations on media such as augmented reality, different media to produce video, interactive presentations, podcasts and even making materials with a vinyl cutter. The sixth graders chose the digital medium through which they wanted to enhance their topic and were paired with university students.

On three occasions, the students went to meet the Grade 6 students. The students worked in close collaboration with the university students. A shared online document allowed the teams to learn about the project asynchronously. This collaborative phase supported each student's productions at a much higher level than if only the teacher was present in class. However, there were many challenges, both for the students and for the supporting teaching team.

Recall that in its reflective aspect, the course addressed pedagogical innovation with digital. No boundaries were set to mark the production. Even when the Grade 6 students had ideas for digital productions that involved materials we did not have, the team worked to get them. This was especially true for the podcast production that required to borrow a sound system. Students' ideas of how to enhance their project were discussed with the university students, who ensured that they supported student engagement and considered what was feasible. Thus, there were practical limitations in mobilizing makerspace tools: materials were not always available when they were needed. Sometimes we had to wait for the next meeting, especially with the machines—the use of the vinyl cutter, for example.

For some tools, the learning curve was quite significant. For example, the interactive map of the province's Aboriginal nations required QR codes, a content presentation tool, and several modalities combined for a project that met the grade six students' aspirations. To get to their end, the students had to search for answers, try, and sometimes get it wrong. Sometimes several members of the project team came together to come up with a solution, as it was the case for a challenge on the ethical use of sources in a project. This mobilization of several people, the mobilization of the expertise of adults and youth, was an innovative element mentioned by students in the end-of-term evaluation.

The project has also been a challenge for classroom management. The organization of work and the rules of a makerspace brought a messiness of its own. The multiplicity of subjects, productions, people and tools used in the project is similar to the makerspaces approach. Teams were scattered throughout the school, using the teachers' room to conduct interviews or cubicles to record narratives. However, the elementary teachers and university students were not used to this type of activity within the classroom, and in this case, the entire school. It would be fair to state that many of the people involved in the project stepped out of their comfort zones.

5.2. Project: Collectively negotiated definition

In the second project, the twenty students were invited to negotiate a collective definition. In class and in asynchronous mode, they worked with a digital tool that they were not familiar with, the Knowledge Forum (KF). Part of the computer-supported collaborative learning (CSCL), the KF is an electronic group workspace designed to support the process of knowledge building. The KF uses scaffolding to build collective discourse. In our case, the students were asked to propose a definition of pedagogical innovation. The principles of knowledge co-construction, presented and linked to the KF scaffolds, helped the students to write contributions, to use various scaffolds, to solicit sources of authority, and ultimately, to improve and transform the discursive practices of the community.

If what is created is not a tangible object, the initiative is in line with the maker philosophy: Creative spaces allow users to craft, transform and equip themselves, as well as participate, share and learn. Indeed, “Maker culture is a form of experiential learning with technology that promises engagement of learners via iterative, ill-defined problem solving and self-directed learning to satisfy 21st century needs” (Davidson & Price, 2017, p. 103). The KF is an online creative space that achieves the same goals. In keeping with the maker spirit, the activity supported the democratization effect as a true negotiation took place.

In this project, the professor almost completely stepped aside. She challenged them to create a negotiated collective definition, dropped off the KF user guide on the learning management system (LMS), and left them with a blank KF page. In the end-of-term course evaluation, many students mentioned that at the beginning, the objective was not clear to them. Others mentioned that they stepped out of their comfort zone. One student mentioned that this was the most chaotic work she had done in her academic career. She added that it was very rewarding, in the end, to confront her ideas with the tools (technological and cognitive) available. One student noted that “the work goes beyond simply composing a definition, the work has made us realize that collaboration among colleagues provides a pedagogical strength that will be useful throughout our careers.” Several students mentioned that if they were to do it again, they would probably speak up more in group discussions. It was the fear of errors that held them back. While mistakes are welcomed in creative spaces, they seem to be less welcome in formal learning.

Although teacher involvement was minimal in this project, several challenges were observed. The tool that supported the co-construction of collective discourse offered technological and cognitive affordances that were entirely new to the students.

More than the tools, it is the mindset of creating something from scratch and exploring one’s own interests that is at the heart of a makerspace (makerspaces.com, n.d.). However, creating something from scratch in a university course setting may have created discomfort for some students. Indeed, the professor perceived moments of hesitation, uncertainty and sometimes stress in some students invited to participate in this collective exercise. Two periods of synchronous work in class allowed the students to consult each other and organize the work. These periods were very beneficial in reminding the students of the criteria for the work and reassuring them.

6. Discussion

Recall that we are interested in how to integrate creative spaces and their philosophy into a formal educational context, in our case, a university course.

Inspired by the maker movement, which supports the development of empowerment made possible in creative spaces, the course wanted to offer the most authentic learning opportunities possible. University students are more accustomed to traditional courses, where they are taught theory before practice. As they begin their careers, they are still developing the reflexes that could be used for projects like the ones they were introduced to. While some technological tools were less familiar to them, the conceptual tools were also a challenge. The innovation they had to demonstrate in the first project and the scaffolding, conceptual tools of knowledge co-construction, in the second project are conceptual tools that had to be tamed to support their empowerment.

In addition, beginning teachers have a classroom management concern. When the university students and the project team visited the students’ classrooms, some might have felt a certain loss of control. However, it can also be approached as a flexible just-in-time format that allows everyone to adapt their environment to the task.

Finally, in creative spaces, knowledge and skills, both individual and collective, serve the project or problem solving. The organization of classes is difficult to cope with the tinkering process of creative spaces, which requires time (not always counted in periods) and the ability to accommodate advances, setbacks and errors in the learning process. Students, future teachers, who are more comfortable in an environment that submits well to traditional lecture-based teaching may have lost their footing at some point in the course. By reassuring them on their competence to teach and make them learn, the professor insisted, however, on the various dimensions of the digital competence to be developed by the citizens of tomorrow and the value of socioconstructivism in a context of mobilization of the digital competency.

7. Conclusion

This was the first iteration of the course. The course evaluation indicated that the majority of students (94%) enjoyed the course. We have learned some lessons from this first year. First, despite our intention to allow as much freedom as possible, there is a good chance that if we were to do the first project again, more guidelines would be given to the students. In particular, the balance of effort and deliverables: some projects seemed modest while the effort to complete them was considerable, but the reverse was also true. Because the project was linked to a research project that is now complete, the project will not be repeated.

As for the negotiated collective definition project, it would be redone in much the same way. The students created a negotiated collective definition and deliver a reflection of which they were proud.

The course is evolving and the second iteration, offered in winter 2023, will feature even more creative spaces. This will be an opportunity to continue thinking about how to integrate creative spaces and their philosophy into a formal educational context, in our case, a university course.

References

- Albert, M. N., & Michaud, N. (2016). From disillusion to the development of professional judgment: Experience of the implementation process of a human complexity course. *SAGE Open*, 6(4), 2158244016684372.
- Blikstein, P. (2013). Digital fabrication and ‘making’ in education: The democratization of invention. Dans J. Walter-Herrmann et C. Bóching (Dir.), *FabLabs : Of machines, makers and inventors* (pp. 203–222). Bielefeld: Transcript Publishers.
- Blikstein, P., & Krannich, D. (2013, June). The makers’ movement and FabLabs in education: experiences, technologies, and research. *In Proceedings of the 12th international conference on interaction design and children* (pp. 613–616). <https://doi.org/10.1145/2485760.2485884>
- Brown, M., McCormack, M., Reeves, J., Brook, D. C., Grajek, S., Alexander, B., ... & Weber, N. (2020). *2020 educause horizon report teaching and learning edition* (pp. 2–58). Educause.
- Davidson, A.-L. & Duponsel, N. (2021). Building a makerspace in a youth center and imagining futures. *2021 IEEE International Symposium on Technology and Society (ISTAS)*, pp. 1– 7. <https://doi.org/10.1109/ISTAS52410.2021.9629131>
- Davidson, A. L. & Price, D. W. (2017). Does your school have the maker fever? An experiential learning approach to developing maker competencies. *LEARNING Landscapes*, 11(1), 103– 120.
- Hatch, M. (2014). *The maker movement manifesto: Rules for innovation in the new world of crafters, hackers, and tinkerers*. New York: McGraw-Hill Education.
- Hira, A., Joslyn, C. H., & Hynes, M. M. (2014, October). Classroom makerspaces: Identifying the opportunities and challenges. 1677–1681. *In 2014 IEEE Frontiers in Education Conference (FIE) Proceedings*.
- Laboratoire d’apprentissage Networks, n. d. <https://www.learninglab-network.com/>
- Makerspaces.com, n.d. What is a makerspace? <https://www.makerspaces.com/what-is-amakerspace/>
- Ministère de l’éducation et de l’enseignement supérieur du Québec (MEES). (2018). Plan d’action numérique. http://www.education.gouv.qc.ca/fileadmin/site_web/documents/ministere/PAN_Plan_action_VF.pdf
- Ministère de l’éducation et de l’enseignement supérieur du Québec (MEES). (2019). Cadre de référence de la compétence numérique. http://www.education.gouv.qc.ca/fileadmin/site_web/documents/ministere/Cadrereference-competence-num.pdf
- Ministère de l’éducation et de l’enseignement supérieur du Québec (MEES). (2020). Référentiel des compétences professionnelles de la profession enseignante. la compétence
- Oldenburg, R. (1999). *The great good place: Cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*, New York, Marlowe.
- Parent, S. & Lord, A. (11-12 mai 2022). *Concertation régionale sur les consensus et tensions liées aux apprentissages dans les espaces créatifs* [Communication orale]. Dans Joncoux, S., Baril, G., Scaillerez, A., Lafontaine, D., Guimont, D. et Davidson, A.-L., Colloque 637 : Laboratoires vivants et autres labs, des outils pour les transitions [Symposium]. ACFAS.
- Tremblay, D. G., & Krauss, G. (2019). Tiers-lieux: Travailler et entreprendre sur les territoires: espaces de co-working, fab labs, hack labs... PUQ.
- St-Arnaud, Y. (2003). *L’interaction professionnelle: Efficacité et coopération*. PUM.