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REDESIGNING LEARNING SPACES DURING A PANDEMIC

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Abstract:

The COVID19 pandemic has forced students into an online learning environment without providing enough lead time for such transitions. With respect to teaching and learning in IT education, there are significant differences in learning spaces provided by online environments when compared with face-to-face environments. In this practice paper, we draw on our personal teaching experiences during the pandemic and examine differences in learning spaces through the lens of digital transformation components in the literature. We make several suggestions that could be adopted by stakeholders of higher education institutions to enhance learning spaces for students and adopt new behavioural norms for a successful transition in IT education.

Keywords: Learning spaces, pandemic, digital transformation

I. INTRODUCTION

A learning space is defined as an environment where teaching or learning happens and is facilitated through the interactions between students and educators, together with physical and digital resources [Giannakos et al., 2016]. The COVID19 pandemic has triggered a new way of learning for students worldwide. At the start of the pandemic there was a sudden transition from face-to-face teaching into fully online teaching which resulted in challenges related to learning spaces. Some of these challenges for students include weak digital infrastructure to access teaching resources from home, shared home network and lack of dedicated study space at home [Singh et al., 2021]. Student engagement is another important factor that must be considered in the new learning space [Dick, 2021]. While redesigning the learning space during this pandemic, disposition components with respect to attitude, behaviour, social skills, and emotional capabilities become highly relevant to the curriculum model [Frezza et al., 2020; Leidig et al., 2020]. The disposition factors are important since it provides control (agency) for learners to accomplish tasks with what they know based on individual capabilities.

With limited time provided for redesigning, several changes were implemented based on the units and best available options. Some learning spaces were offered fully online whereas others were offered in hybrid mode with online lectures and face-to-face tutorials. In some cases, students were given the option to attend lessons either in a synchronous or asynchronous mode. Thus, it is evident that redesigned learning spaces are intertwined with physical [e.g. dedicated study space at home], technological [e.g. digital infrastructure] and people [e.g. social interaction, engagement and competency] aspects which align with the digital transformation components in literature

[Baumgartner et al., 2021; Dery et al., 2017]. As we prepare for the future, examining learning spaces through the lens of digital transformation components will help us understand and move forward through the pandemic with limited impact on students' learning experiences. Drawing on our personal teaching experiences during the pandemic, the extent of digital transformation components with respect to Technology, Place and People embraced in our teaching is illustrated and discussed below [Figure 1].

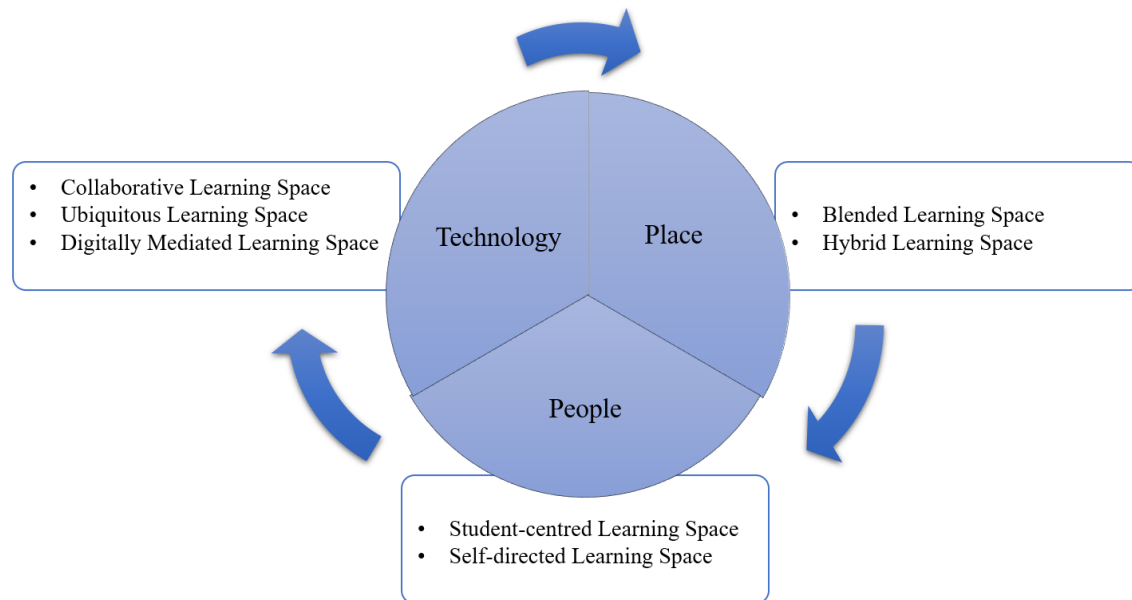


Figure 1: Redesigned Learning Spaces based on Digital Transformation Components [Baumgartner et al., 2021]

II. TECHNOLOGY

Based on our experience in using technology-supported learning environments, we classify learning spaces into three types.

Collaborative learning spaces played an important role during the early stages of the pandemic where engagement and student collaboration contributed to the scholarship of practice. Piazza is a collaborative learning space that helps a community of learners to interact among themselves and with their facilitators [John, 2013]. Piazza also offers several features such as endorsements, ratings and detailed reports which help educators to understand and analyse student collaboration and learning. Piazza engages students to actively participate in online tutorials. Hence, participation in Piazza was used for summative assessments. This was achieved by grading students' responses to weekly activities, monitoring the frequency of participation and feedback on other students' contributions. Piazza is just one example; similar engagement can be provided by traditional discussion board or by a closed social media group. While the discussion board in the University Learning Management System [LMS] creates a closed classroom environment, interactions in a closed social media group [e.g. Facebook Group] offers a personal networking environment for students. Thus, a collaborative learning space offers a learning environment that is outside their classroom, but a private and flexible setting that provides an opportunity for students to engage freely and achieve learning outcomes.

Ubiquitous learning spaces facilitated seamless learning from any location and at any time [Virtanen et al., 2018]. It supports effortless interaction with authentic and digital learning resources and provide a personalised learning environment. To ensure ubiquitous access, short concept clip videos [instead of traditional lectures] were uploaded into a cloud platform. These digital resources

were accessible anytime and anywhere through the University LMS and the access was restricted to the stakeholders of university. Video recordings on research findings by academic experts as well as case studies by industry experts were presented to students which resulted in a smooth integration of theory and practical skills. Ubiquitous learning spaces made it possible to bring both local and international experts into the learning environment by facilitating synchronous and asynchronous presentations. To list, Echo 360, Zoom, Teams, and Blackboard collaborate are some of the technologies that facilitate ubiquitous learning spaces. To support tutorials, all required software [e.g. relational and NoSQL databases] were accessible via a Virtual Machine which helped students with digital infrastructure challenges. Analytics integrated with the LMS helped staff members to monitor student activities and attendance. The presentation transcripts and options to vary the speed of recordings increased the accessibility of learning resources. Thus, the digital resources discussed above helped to transform traditional learning into a ubiquitous learning space.

Digitally mediated learning spaces are empowered by innovative technologies that mediate effective learning [Atiq et al., 2019]. Digital technologies such as Cisco Learning Network Binary Game and Cisco Packet Tracer were used in online tutorials to create an appropriate environment that supported and guided learners. The Cisco Packet Tracer visualisation tool was used for creating network topologies and to simulate modern computer networks. A Binary Game from the Cisco Learning Network was used to teach the basic concepts of IP addressing. Microsoft Sway, an interactive presentation tool was used to create a learning guide for each week. These approaches reflected the “Fun” component in the redesigned learning space [Liu & Hwang, 2010]. To embed assessments in a digital environment, online examinations [fixed duration, and open book] based on authentic case studies were used instead of traditional examinations. The features of the LMS [i.e. user exceptions, prohibit backtracking and randomised questions] were used to support students with learning access plans and ensure the academic integrity of online examinations. Zoom and Kahoot quizzes were organised to support and guide students to test their understanding of major concepts covered in a week. In an introductory programming unit, “Turtle” Programming and creating music tracks from thousands of clips in the EarSketch programming environment were used to engage students in tutorials. The Cengage MindTap digital learning tool was used to provide industry relevant articles for students to stay current in the emerging field of Business Informatics. Thus, the technologies described above provide the necessary support required to offer units and address the needs of students in a digitally mediated learning space.

Two disposition factors impacted by the technology component of redesigned learning spaces are:

1. **Collaboration:** To promote collaboration and productivity in the redesigned learning space, Piazza was used for summative assessment. The assignment was structured in such a way that peer review [i.e. commenting on other students’ posts] was one of the criteria in the evaluation of the assignment. This encouraged endorsements and constructive comments from students which reflect the disposition factor of collaboration in the curriculum competency model.
2. **Adaptable:** To address the needs of a redesigned learning space, all assessments were offered online on the LMS. The final examination was open book and scheduled for a fixed duration. To maintain academic integrity, questions were based on case studies and chosen from a randomized pool and backtracking of questions were disabled. To prepare students for this change in the redesigned learning space, sample assessment questions were discussed in tutorials.

Technology-supported learning spaces which include collaborative, ubiquitous and digitally mediated learning spaces embed the qualities of inquiry, collaboration, evaluation, and social skills. As educators innovate and implement technology enabled learning space with Piazza, social media, a virtual machine, Zoom, Packet Tracer, LMS and the Cengage MindTap digital learning tool, it also comes with an additional overload to provide the necessary training required for educators to offer the content online at different campuses. Hence, there is a need to ensure that educators are well equipped and trained to manage and demonstrate leadership skills [Dery et al., 2017], which is one of the behavioural norms required for a successful digital transformation.

III. PLACE

The place witnessed a significant shift during the COVID19 pandemic. The early days of the pandemic resulted in an immediate and complete shutdown of the face-to-face lectures and tutorials. The change from classroom environment into a private learning space facilitated by technology is an important transformation.

The blended learning space helped to transform the physical place by incorporating flipped mode of learning which is student centric where educators act only as facilitators [Dick et al., 2020]. During the unprecedented lockdowns, traditional lectures were replaced with pre-recorded short concept videos. Three short concept video clips [20 minutes each] were pre-recorded which replaced the one-hour weekly lecture. We scaffolded each concept video clip with activities that addressed the learning objectives for a week. This blended learning approach was adopted to remove the information overload of traditional lectures [Alaagib et al., 2019]. This also ensured constructive alignment of learning objectives in the redesigned learning space. The strategy that we followed to assess and provide feedback to students in online tutorials included [a] quantifying assessment requirements [e.g. two benefits of an approach] in a rubric which was designed to add clarity to assessment tasks [b] providing a recorded overview of assessment tasks [c] providing a sample assignment report based on an industry case study to understand the unit's competency requirements [d] providing assessment tasks at least 4 weeks in advance to provide feedback and [e] providing formative assessments for students to practice. Furthermore, we reduced the number of assessment tasks in a unit from four to two, spread the assessment tasks evenly across the semester and provided constructive feedback through a discussion board, which was administered by the teaching team. Due to online tutorials and to limit the digital infrastructure challenges faced by students, the software used in IT tutorials were available on a Virtual Machine as discussed in the technology-supported learning space. This approach allowed us to offer online units without any physical place restrictions during the pandemic.

A hybrid learning space is the new norm which offers fully online or a combination of face-to-face and online lessons [Dick et al., 2020]. Some students preferred attending lessons on campus whereas others preferred online due to personal circumstances such as international students or under quarantine. Though only online study mode was offered at the start of the pandemic, later stages of COVID19 saw the place component split into three modes. One, a completely online offering, second, completely in class and third, a hybrid model with face-to-face tutorials in small groups and online lectures for the entire cohort. Yet another variation of hybrid mode was to offer lectures simultaneously in the lecture theatre and online on a Zoom/Teams/Blackboard Collaborate environment. In the redesigned learning space, two modes of unit offering were designed to address the needs of diverse range of students including full-time working professionals. The breakout rooms on Zoom, Teams or Blackboard Collaborate were used for synchronous discussion and the discussion board were used for asynchronous discussion. Educators joined the student breakout rooms to encourage participation and facilitate discussion among students. In the hybrid learning space, there is always a need to make sure that educators are ready for a timely response to student queries.

Two disposition factors impacted by the place component of redesigned learning spaces are:

1. **Attentive to detail:** The assessment criteria were quantified to help students to differentiate between the requirements for each grade and to avoid confusion. For example, the criteria used was – “all driving and restraining forces or a broad range of driving and restraining forces, two key driving and two restraining forces or at least one driving and one restraining force or does not describe relevant driving and restraining forces” [adopted from a unit's Rubric].
2. **With discretion:** In the major assessment [40% weighting] students were given the opportunity to apply Business Informatics concepts to an authentic case study in the Local Government Area [LGA] taking into consideration the cultural and other forms of diversity

in a community. This approach was adopted to instil an inquisitive approach in students. For example, the assessment criteria used was – “examine the driving and restraining forces that stakeholders will consider in their decision-making process to adopt a new system in the LGA” [adopted from a unit’s Rubric].

The design, implementation, and timely interaction to engage students in both blended and hybrid learning spaces come with an additional focus and effort on educators to manage these sessions effectively. Hence, as a recommendation for redesigning learning spaces, we must ensure that educators are provided with best practices that demonstrate systemic learning [Dery et al., 2017], which is one of the behavioural norms required for a successful digital transformation.

IV. PEOPLE

In addition to technology and place, the passion and dedication of people [i.e. educators and students] play a vital role in digital transformation. In the redesigned learning space educators take additional effort in student engagement, while students engage in collaboration and provide feedback/endorsement with peers.

Student-centred learning spaces are created by designing activities that engage students and actively involve them in the learning process [Wright, 2011]. The interaction of students with learning resources and with other students play a significant role in the student-centred learning space. While the earlier sections emphasised the use of technologies and place to create an interactive learning space, this section describes how content delivery can be redesigned to promote student-centred learning spaces. The digital learning resources were presented following a Read, Visualise, Study and Apply learning activities model [Cengage Publishing, 2021]. This was adopted to engage students in the redesigned learning space by enhancing their self-efficacy and time management skills. In the Read activities, the learning objectives for a week and its relation to the unit learning objectives were provided. In addition, a weekly reading list to stay current in the field was also provided. In the Visualise activities, engaging concept clip videos to explain and illustrate terms and concepts were provided. In the Study activities, main concepts were reviewed with PowerPoints, reinforced with interactive flashcards, and practiced with crossword puzzles. The interactive flashcards and crossword puzzles were adopted to provide student engagement in the redesigned learning space. An overview of the weekly content [2 minutes recording] was posted and learning materials were organised to help mature students make good use of their time while working full-time. In the Apply activities, an adaptive quiz tested knowledge and provided automatic feedback with references to sections in the textbook for incorrect answers. Furthermore, critical thinking exercises and authentic case studies were used in online tutorials to help learners analyse, evaluate, and apply principles to real-world complex situations. While student-centred learning space increased the flexibility for students, there is an important need for educators to be available in a timely manner to mentor students and support them as they navigate and progress through the redesigned learning space.

Self-directed learning spaces are designed with activities that motivate or inspire students to progress in their learning. For specific topics, LinkedIn learning videos presented by industry experts provided a platform for learners to acquire the digital literacy competency [e.g. PowerBI Analytics] required at future workplaces. The LinkedIn learning videos also provided a completion certificate after a formative assessment, which created an opportunity for students to complete tasks with purpose. We encouraged students to post their accomplishments on the discussion board of the LMS. A weekly discussion thread based on assessment tasks was posted with formative questions which provided an opportunity for students to engage, evaluate, learn, and be reminded about forthcoming assessments. Furthermore, weekly announcements which included a “To-Do List” were posted to direct students to complete background reading before attending tutorials. The tutorials were structured to include preparatory, in-class and advanced learning activities which provided an opportunity for self-directed learners to attempt advanced learning activities and establish mastery in a field. The self-directed learning approach that we adopted was to support and engage students during the unprecedented times of COVID19. To support students, transcripts of concept video clips and tutorials were posted which helped learners with diverse

learning needs. This reflect social symbols of change [Dery et al., 2017] which is one of the new behavioural norms required for a successful digital transformation. The role of educators to motivate and support students in a timely manner is an important component that leads to the success of a self-directed learning space.

Two disposition factors impacted by the people component of redesigned learning spaces are:

1. **Self-Directed:** The tutorials were structured to include preparatory, in-class and advanced learning activities which provided an opportunity for self-directed learners to complete advanced learning activities and establish mastery in the field. The preparatory tasks focused on simple activities with detailed instructions, the in-class tasks focused on activities that built upon the case study used in preparatory tasks and had limited step-by-step instructions. On the other hand, advanced tasks allowed students to be creative since those tasks were not provided with step-by-step instructions to achieve the desired results.
2. **With Passion:** We provided an opportunity for students to listen to the pre-recorded LinkedIn videos presented by industry speakers and complete formative tasks provided in the videos for a LinkedIn certificate. Students were encouraged to post certificates on the course discussion board to demonstrate their commitment and enthusiasm in achieving course goals which reflect the disposition factor of passion embedded in the curriculum competency model.

From the perspective of educators, content delivery must ensure the needs of diverse students. In addition, educators must also consider the scheduling of units to target students who are working full-time. Hence, as a recommendation for redesigning learning spaces, we must ensure that teaching teams are ready for a change that demonstrate responsive leadership [Dery et al., 2017], which is one of the behavioural norms required for a successful digital transformation.

There are several disposition factors discussed in the literature [Frezza et al., 2020; Leidig et al., 2020] and based on our teaching experience in the new learning space, we were able to identify six factors which are Collaboration, Adaptable, Attentive to detail, Discretion, Self-Directed and Passion. Further research could link (and measure) the disposition factors associated with the new environment.

V. CONCLUSION

In this study, we presented the lessons learned based on redesigning learning spaces and its alignment with the components of digital transformation and disposition-based competency model. Our teaching experiences during the pandemic reveals that the digital transformation of learning spaces have provided benefits and challenges to students and educators. For students, it has provided different modes of study which can be chosen based on their individual preferences. The redesigned learning space provided an opportunity to enrol either in completely online or hybrid mode of study. In the future, students will be able to improve their learning by choosing the appropriate model that suits them. This will enhance flexibility and will enable better results. Universities must ensure that educators are provided with the necessary support to embrace these changes while redesigning the learning space as we move forward through the pandemic. Universities must recognise that the enhanced learning tools used in the redesigned learning space will require additional teacher training and support. It is also worthwhile for the administrators of higher education institutions to examine the redesigned learning spaces with respect to digital transformation components to maximise the learning experiences for students. Though we share our experiences with respect to IT education, some of these approaches won't be the choice for other education programs. In conclusion, the redesigned learning spaces provided us with an opportunity to examine the components of digital transformation and disposition factors in IT education.

VI. REFERENCES

- Atiq, A., Saha, S., & Mirza, F. (2019). "Conceptual Model for the Use of Smart Glasses in Ubiquitous Teaching (u-teaching)", *ACIS 2019 Conference*, Australia.
- Alaagib, N. A., Musa, O. A., & Saeed, A. M. (2019). "Comparison of the effectiveness of lectures based on problems and traditional lectures in physiology teaching in Sudan". *BMC medical education*, 19(1), 1-8.
- Baumgartner, C., Hartl, E., & Hess, T. (2021). "New Workplace, New Mindset: Empirical Case Studies on the Interplay between Digital Workplace and Organizational Culture". *The International Conference on Business Information Systems (WI 2021)*.
- Cengage Publishing. (2021), *MindTap* accessible at <https://au.cengage.com/mindtap/>
- Dery, K., Sebastian, I. M., & van der Meulen, N. (2017). "The Digital Workplace is Key to Digital Innovation". *MIS Quarterly Executive*, 16(2).
- Dick, G. (2021). "Teaching online: Creating student engagement". *Communications of the Association for Information Systems*, 48(1), 7.
- Dick, G., Akbulut, A. Y., & Matta, V. (2020). "Teaching and learning transformation in the time of the Coronavirus crisis". *Journal of Information Technology Case and Application Research*, 22(4), 243-255.
- Frezza, S., Clear, T., & Clear, A. (2020). "Unpacking Dispositions in the CC2020 Computing Curriculum Overview Report". In *2020 IEEE Frontiers in Education Conference (FIE)* (pp. 1-8). IEEE.
- Giannakos, M. N., Krogstie, J., & Aalberg, T. (2016). "Video-based learning ecosystem to support active learning: application to an introductory computer science course". *Smart Learning Environments*, 3(1), 1-13.
- John, B. (2013). "Micro-collaborations in piazza". In *Proceedings of the AIS SIG-ED IAIM 2013 Conference*.
- Leidig, Paul M., Hannu Salmela, Greg Anderson, Jeffrey Babb, Lesley A. Gardner, Jay F. Nunamaker Jr, Brenda Scholtz et al. (2020) *ACM/AIS IS2020: Updating the IS model curriculum*. AMCIS 2020 Proceedings.
- Liu, G. Z., & Hwang, G. J. (2010). "A key step to understanding paradigm shifts in e-learning: towards context-aware ubiquitous learning". *British Journal of Educational Technology*, 41(2), E1-E9.
- Singh, J. B., Sharma, S. K., & Gupta, P. (2021). "Physical Learning Environment Challenges in the Digital Divide: How to Design Effective Instruction during COVID-19?". *Communications of the Association for Information Systems*, 48(1), 18.
- Virtanen, M. A., Haavisto, E., Liikanen, E., & Kääriäinen, M. (2018). "Ubiquitous learning environments in higher education: A scoping literature review". *Education and Information Technologies*, 23(2), 985-998.
- Wright, G. B. (2011). "Student-centered learning in higher education". *International Journal of Teaching and Learning in Higher Education*, 23(1), 92-97.