Student and Facilitator Experiences of Transition to Online Enquiry/Problem Based Learning during the COVID-19 Pandemic.

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Abstract.

Purpose: This paper explores the experience of students and facilitators of Enquiry/Problem-Based Learning (E/PBL) as it transitioned online during the COVID-19 pandemic.

Method: This two-phased mixed-methods sequential explanatory design study targeted academic staff and students engaged in online E/PBL during COVID-19 restrictions. The experience of enforced transition to online provision of E/PBL was examined in terms of the impact of digital tools on curriculum delivery and student perception of online E/PBL. In Phase 1, academic staff (n=21) and students (n= 67) responded to a survey that explored use of digital tools and experiences of online E/PBL. In Phase 2, academic staff (n=6) and students (n=2) participated in focus groups which were designed to elicit current and retrospective perspectives of the transition to online E/PBL.

Results: Findings revealed that a number of digital tools were beneficial in assisting the delivery of online E/PBL. However, challenges were experienced by both facilitators and students with respect to technological competence and variance in IT access.

Student responses suggested that communication barriers, inherent to the online environment, impacted on interactivity, which resulted in more active input being required from facilitators to promote student engagement. Most respondents revealed that they became increasingly comfortable in the online environment despite initial reservations, and that some changes in practice can help overcome limitations of digital tools.

Conclusion: Engaging in online E/PBL presented diverse views amongst both facilitators and students on how best to support transition to student-centred learning and teaching methodology online. Recommendations from this study highlight the need for digital and technological training to enhance facilitator competence and the importance of building rapport, structure activities, and promote social cohesion amongst learners.

Keywords: Digital teaching; Enquiry based learning; Online education; Problem based learning; Student-centred learning methodology; Transition to online.

1.   Introduction.

The Enquiry/Problem Based Learning (E/PBL) is a student-centred learning and teaching methodology originally promoted at McMaster University in Canada (Chick et al., 2020; Delaney 2022; Eva & Anderson, 2020; Schmidt, 1983; Schmidt et al., 2009). Initially designed as a face-to-face learning and teaching approach in medicine, E/PBL is widely used in higher education across many disciplines and subject fields (Barrett, 2010; Barrows, 1986, 1996; Delaney, 2022; Secker, 2002). Digital spaces for learning and teaching, have gained popularity over the last decade (Savin-Baden & Bhakta, 2019, Reader & Savin-Baden, 2021). The term digital space refers to what is displayed on the screen of a digital device and can take many forms, broadly describing technology methods that enable learning and teaching supported instructional practice (Ifenthaler et al., 2014; Kumar Basak et al., 2018).

A fundamental feature of E/PBL is to enable students to develop group working skills so that they can collaborate meaningfully together and learn in a deeper and more sustained manner (De Graaf & Kolmos, 2003; Delaney et al., 2017; Ng et al., 2014; Noordegraaf-Eelens et al., 2019; Visschers-Pleijers, 2006). Within this model, groups begin with assigning specific functions or roles such as chairperson, timekeeper and scribe (Barrett & Moore, 2011). E/PBL encourages students to develop real world critical thinking and reasoning skills while nurturing collaborative and self-directed learning and engendering students' motivation and intellectual curiosity (Donnelly, 2013; Yew & Schmidt, 2012). According to Hung et al., (2019), the exploration of social context and reciprocal interactions during E/PBL methods play a critical role in shaping students' understanding and competence for their profession.

However, digital learning environments require a significant pedagogical shift on the part of the student to adapt new ways of cognitive engagement, self-regulation and motivation (Börnert-Ringleb et al., 2021; Kolbaek, 2018; Savin-Baden and MacKenzie, 2022)

The COVID-19 pandemic resulted in the cessation of all in-person classes/tutorials across all sectors of education in the Republic of Ireland in March 2020. To minimise interruptions in teaching, where possible, education institutions continued learning and teaching using online platforms. Challenges to understanding what worked well and not so well on these platforms

during the pandemic, include the interchangeable terms used to describe eLearning e.g., online, virtual, distant, mobile and/or digital learning, and blended/hybrid. The aim of this paper is to explore influences and learners' experiences of transitioning to online E/PBL to continue education during the COVID-19 pandemic.

Specifically, the primary aim of this study was to explore the transition to online E/PBL across a variety of disciplines in multiple HEIs in Ireland during the COVID-19 pandemic from the perspective of both academic staff (referred to hereafter as '*facilitators'* in line with the principles of E/PBL) and students. This study also examined the impact of digital tools on curriculum delivery and student perception of the transition to online E/PBL.

2.   Method.

2.1 Design.

A sequential explanatory mixed-methods design was used. Quantitative instruments were used first to identify the significant aspects of transition to online E/PBL for facilitators and students (Phase 1). Subsequent interviews and focus groups then explored these identified aspects in a qualitative manner to elucidate the relevant experiences (Phase 2). Schema for the design, along with associated actions and products, is outlined in Figure 1.

2.2 Ethics.

Ethical approval was received from the internal review boards of all participating institutions.

2.3 Participants.

Phase 1 involved 67 student participants from across Art & Design, Education, Engineering, Humanities, Nursing/Midwifery, and Science. Facilitators were 21 professionals with backgrounds across Business, Clinical Therapies, Engineering, Nursing/Midwifery, Paramedic Studies, and Science. Phase 2 involved 2 students (1 male, 1 female), and 6 facilitators (1 male, 5 females) who agreed to participate from Phase 1. Participant information is summarised in Table 1.

Table 1: Participant demographic information.

	Phase 1	Phase 2
Facilitators	n=21	n=6
Students	n=67	n=2
Undergraduate	n=50	n=2
Postgraduate	n=5	
Full-time	n=53	n=2
Part-time	n=2	

2.4 Materials.

2.4.1 Phase 1.

Student questionnaire. This consisted of 58 items with questions addressing demographic background of participants (including learning background), experience of online learning and relevant tools, and incorporating the Lander (2008) scale (supplementary file 1), as well as 8 final open response questions. The Lander scale was created by E/PBL staff at Manchester University Centre for Excellence in Enquiry-Based Learning (CEEBL) to appraise the impacts and outcomes of EBL at their institution and to provide '*evidence, feedback and constructive criticism*' for future EBL initiatives (Lee et al., 2008; Lander, 2008; Powell, 2007, p.4). The foundational constructs of the questionnaire were based on Kirkpatrick's (1996, 1959) multi-level evaluation of learning model namely, i) student reaction, ii) student learning and iii) student behaviour.

Facilitator questionnaire. This consisted of 30 items with questions addressing demographics background of participants (2 items), experience of online learning (24 items), and some open response questions on their experience (4 items) (supplementary file 2).

2.4.2 Phase 2.

Interviews and focus groups were conducted via MS Teams® during a period where in-person meetings were still restricted. The transcription feature of MS Teams® provided the initial draft of interview transcripts, which was then revised by author 1 and reviewed before undergoing

analysis.

2.5 Procedure.

Participants were recruited via email invitation across the four participating institutions between November 2021 and February 2022. Emails were targeted across staff and student groups who were known to have been engaged in E/PBL during the enforced transition to online learning in Spring 2020. Participants completed the questionnaires online via Qualtrics ® (Qualtrics, 2023). An expression of interest was included as a final question on the survey inviting participants to Phase 2.
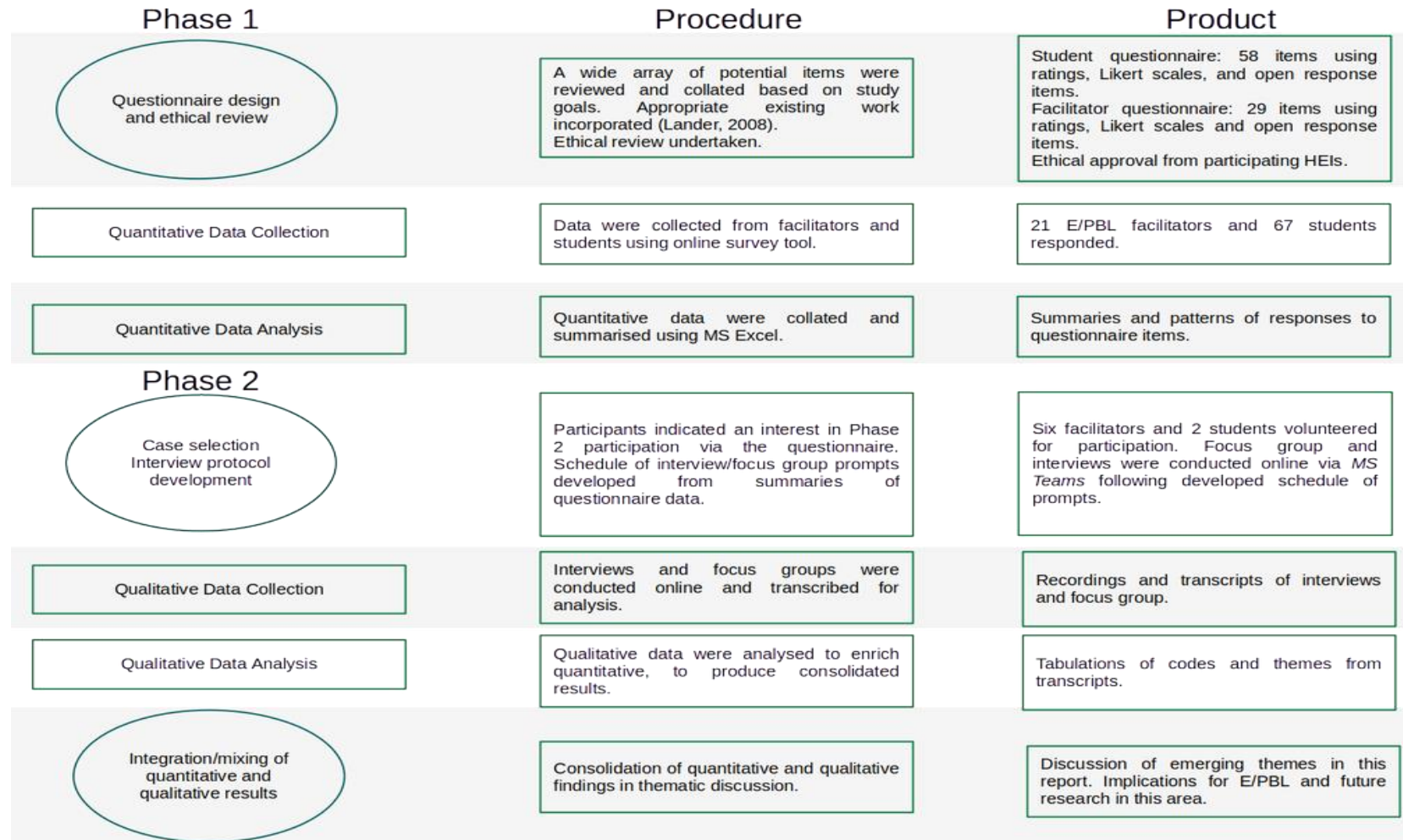
2.6 Data analysis.

Qualitative data were coded and themed according to Miles, Huberman, and Saldana's (2020) framework. MS Excel® was used to categorise and summarise the quantitative data.

3.   Consolidated Results.

A key feature of mixed methods research is the integration of data informally referred to as '*mixing*'. Mixing is the explicit interrelating of the study's quantitative and qualitative strands (Creswell and Plano-Clark, 2018). In this study, mixing occurred during integration and interpretation, where the researchers drew conclusions that reflected what was learned from combining the results of the two study strands. Data were produced following an explanatory sequential design in which qualitative data were evoked to enrich and expand on initial quantitative data (see Figure 1 for scheme and overview). Following the Miles et al., (2020) framework, 4 themes and 12 sub-themes were discerned in the data and are displayed in Table 2. The main study themes related to Navigating Digital Tools, Adaptation to Online E/PBL, the E/PBL Tutorial, and the Student Experience. Results are presented by theme, leading initial descriptive quantitative findings followed by qualitative discussion. Quotations were coded by participant (F = facilitator, S = student), grouping (G = focus group, S = Survey) (e.g., Facilitator Survey 1 = FS1, Student Group 2 = SG2).

Figure 1: Mixed methods, explanatory sequential design (Adapted from Creswell & Plano-Clark, 2018)

Phase 1	Procedure	Product
Questionnaire design and ethical review	A wide array of potential items were reviewed and collated based on study goals. Appropriate existing work incorporated (Lander, 2008). Ethical review undertaken.	Student questionnaire: 58 items using ratings, Likert scales, and open response items. Facilitator questionnaire: 29 items using ratings, Likert scales and open response items. Ethical approval from participating HEIs.
Quantitative Data Collection	Data were collected from facilitators and students using online survey tool.	21 E/PBL facilitators and 67 students responded.
Quantitative Data Analysis	Quantitative data were collated and summarised using MS Excel.	Summaries and patterns of responses to questionnaire items.

Phase 2		
Case selection Interview protocol development	Participants indicated an interest in Phase 2 participation via the questionnaire. Schedule of interview/focus group prompts developed from summaries of questionnaire data.	Six facilitators and 2 students volunteered for participation. Focus group and interviews were conducted online via *MS Teams* following developed schedule of prompts.
Qualitative Data Collection	Interviews and focus groups were conducted online and transcribed for analysis.	Recordings and transcripts of interviews and focus group.
Qualitative Data Analysis	Qualitative data were analysed to enrich quantitative, to produce consolidated results.	Tabulations of codes and themes from transcripts.
Integration/mixing of quantitative and qualitative results	Consolidation of quantitative and qualitative findings in thematic discussion.	Discussion of emerging themes in this report. Implications for E/PBL and future research in this area.

Table 2: Themes and sub-themes identified from written response to open survey questions (Phase 1), and interviews and focus group (Phase 2).

Theme 1: Navigating digital tools	Theme 2: Adaptation to online PBL
Sub-themes:	**Sub-themes:**
Use and impact of digital tools	Initial expectations
Technological competence	Actual experience
Digital knowledge in action	Views evolving over time
Theme 3: The E/PBL tutorial	**Theme 4: The student experience**
Sub-themes:	**Sub-themes:**
Setting expectations and structure of the tutorial	The successful student
Barriers to communication	Impact of external variables
E/PBL engagement and feedforward teaching approaches	Influence of online E/PBL on social presence

3.1 Theme 1: Navigating digital tools.

Use and impact of digital tools.

Quantitative data revealed that the student experience of the transition to online E/PBL was mixed, with 41% indicating it was difficult or very difficult. A variety of digital platforms/tools were experienced, with the most frequently used being MS Teams® (40%) and Moodle® (26%). In the qualitative phase, students identified several functions that they considered to support their learning. Identifying how the platform could better support their learning, students indicated the need for more interaction, e.g., "*more polls and interaction sections online" (SS34)* and training, *"more training for facilitators and students*" (SS1).

Facilitators quantitatively identified breakout room functions as useful for facilitation of E/PBL sessions (81%) – qualitatively, these supported both observation of students in smaller groups as well as providing insights to animate subsequent plenary discussions. "*We had breakout rooms, and we would come back periodically into a plenary session where we could share any insights that were happening in the individual channels to each group*" (FG1).

However, students' perceptions were less positive, as participation from fellow students was perceived as limited, "*not everyone takes part in the breakout rooms, so it makes it somewhat pointless*" (SS10), "*breakout rooms were generally a waste of time as nobody participated*" (SS26).

Notably, structured groups were identified as of benefit: "*roles assigned are [a] great help to get everyone's opinions on different topics*" (SS61).

Technological competence.

Qualitative responses indicated that the efficacy of digital tools is affected by digital skills competency, a need for training, and equal access to technology. Staff indicated a significant downward adjustment of expected student competency, "*They're [the students] actually not particularly more skilled than me*" (FG1), "*I thought the students would be further ahead technically*" (FG5). Staff discussed being relied on by students, particularly in arranging breakout rooms, was accompanied by feelings of "*pressure*" (FG3), remediated by having a "*contingency plan in place*" (FG4).

Digital knowledge in action.

Levels of technical support were perceived as important by staff, but experience was varied, "*If anybody had any issue or query, they were really only an email or a phone call away*" (FG6), but "*It's very frustrating and I think [lack of] tech support has been an issue*" (FG3).

Furthermore, specific to engineering faculties, some facilitators reported that online teaching is not suitable for this "*inherently practical subject*" (FS12). However, another respondent outlined that the use of the OneNote platform within Microsoft Teams® has integrated well to facilitate the online E/PBL process when students have access to an iPad/tablet device (FS17). FS17 also offered a suggestion to improve this process for free-hand sketching "*A common OneNote page / whiteboard, updated in real time with students having a stylus pen to sketch / comment / make notes*".

3.2 Theme 2: Adaptation to online E/PBL.

The transition to online E/PBL was quantitatively reported as difficult or very difficult by 42% of students with 36% of facilitators indicating the same. Qualitative data present elaborations.

Initial expectations.

The initial expectations regarding the transition to online E/PBL were, naturally, characterised by feelings of apprehensiveness. For 40% of student respondents, online E/PBL during the COVID-19 pandemic was their first exposure to E/PBL. This meant that these students were not only learning in a new way but were also engaging with their new learning in a new way. Despite this, quantitatively, 76% of students revealed that they felt much or very much more in charge of their learning in E/PBL. According to students, analytical skills (58%), communication skills (72%), planning learning skills (75%) and confidence in ability to source information (79%) were also enhanced through online E/PBL.

The Lander survey on E/PBL student experience, explored student's initial expectations of their learning during the transition to online. Despite students reporting to spend over 50% of their time preparing for learning in between lectures and tutorial sessions, only 31% of students were likely to engage in asking questions or offering suggestions during lectures/tutorials.

A small majority of students (54%) indicated that they prepared well or very well beforehand for tutorials while 82% indicated that they collaborated well or very well with their group members. Synchronous online communication seemed to work well for students with 88% indicating they listened carefully or very carefully to what their team members were saying.

Qualitatively, facilitators described feelings of being "*anxious*" (FG3) and "*sceptical*" (FG6) about the rapid, unplanned transition to the digital space. The adaptation itself was described as a "*crash course*" (FG6) and "*steep learning curve*" (FG6). Quantitatively, facilitators (56%) reported students' ability to deeply process content was not impacted during E/PBL online when compared to in-person E/PBL. Half of facilitators believed students (50%) played a more active role in the process of E/PBL when online.

Within focus groups, facilitators described instances where they felt pressure to provide increased input in comparison to face-to-face E/ PBL, despite acknowledging that increased facilitator involvement is not in keeping with the philosophy of this approach. As FG4 states *"[…] I felt as a facilitator, I probably had to be part of the process a little bit more than I usually did face-to-face and try to promote that online integration and help students to reflect a little bit more.*"

This occurrence did not go unnoticed by students as 73% agreed with the statement that facilitators enabled communication within their E/PBL tutorial group. As SG2 pointed out "*They*

[facilitators] were very engaged, very engaged. I actually felt they were more engaged than face-to-face."

Actual experience.

Qualitative results indicate facilitators felt their ability to adapt E/PBL to the online environment was enhanced over time. The ability to successfully navigate digital barriers appears to be a key component of becoming more confident in the ability to facilitate E/PBL online as captured by FS19 "*Once I learned how to operate the technology, I simply conducted the PBL session in the same fashion I would do in-person*" and "*It is certainty possible to do online E/PBL successfully in our experience*" (FS17). Indeed, some facilitators expressed that "*it was a more positive experience than anticipated*" (FS9).

Views evolving over time.

The flexibility of the online space for hosting '*hybrid tutorials*' was also pointed out as a positive attribute, which was assimilated into everyday practice, as stated by FG6 who reported "*nobody thinks twice about it anymore*". Views regarding preferences about using online E/PBL in curriculum delivery moving forward varied among facilitators and students. Some facilitators and students indicated a preference for a blended approach. As students stated, "*I do think it should be blended learning*" (SG2) and "*I do think a hybrid of online and F2F [face-to-face] would best support [it]*" (SS49)

3.3 Theme 3: The E/ PBL tutorial.

Setting expectations and structure of the tutorial.

The importance of ground rules was perceived as fundamental to the E/PBL process to set shared expectations for the tutorials. In particular, the terms of reference, including a rule regarding the necessity of turning on the cameras, was deemed conducive to successfully running tutorials. As FG4 states "*[…]in the terms of reference at the start of PBL, we ask groups to set their own rules for the group and within those we would have encouraged [that] their cameras [were] turned on for active participation and it was written out as a term of reference for the group*". SS8 also reports the benefits of having cameras on for participation stating, "*turn the camera on, it makes it a lot more fun, personal and gives a greater feeling of being connected to the team*".

Some facilitators described replicating the format of face-to-face tutorials online, while other

participants reported that more preparation was required for the transition to online. As FG1 reported "*I found I just had to prepare in a very fine-grained way […] that was one thing that has [been] a benefit because it left me with a set of lesson plans and also some post lesson reflections*".

Barriers to communication.

All facilitators perceived the online environment to be sub-optimal for effective communication. As FG3 states "*you simply cannot communicate effectively online*". Given that effective communication is necessary for establishing group dynamics, it is interesting to note 94% of the respondents to the facilitator survey agreed with the statement "*I believe online E/PBL leads to a more challenging experience of establishing group dynamics.*"

This view was strengthened by students who outlined that "*non-verbal communication was like non-existent*" (SG1). This was an interesting finding as quantitative data revealed that only 41% of students had difficulty or significant difficulty with the approach.   Specific reasons which impinged on communication include:

The natural flow of conversations was disrupted, as FG3 commented "*This kind of more strict timing structure on the conversation, which I think we found very difficult and I still find it difficult you know, to negotiate online conversations in that way because they're kind of unnatural.*"

The ability to "*hide*'" behind peers, as outlined by a FS15 "*It is easier for students to hide behind their peers in an online class, even with small groups. I find that overall, students were less engaged in the online classroom. Students are also under the impression that because classes are online and often recorded, that they do not have to engage with the scheduled classes.*"

However, the ability of students to hide behind screens was reported by some facilitators to aid engagement for students who were perceived to be reticent.   As FG2 pointed out "*So face to face, they're quite hesitant, but I think online, especially if they don't have their cameras on, they're actually much more willing to kind of speak up and contribute to discussion.*"

E/PBL Engagement and feedforward teaching approaches.

The online environment appeared to change the engagement between facilitators and students, in particular for facilitator availability outside of scheduled tutorial hours. Some facilitators reported a perceived reluctance for students to contact facilitators with questions or feedback due to the "*substantial weight of communication*" (FG2) associated with student emails. As a result, situations which may have had a relatively straightforward solution in-person could

become challenging to solve as students tended to "*wait and wait and wait*" (FG2). The student survey data indicates that they were appreciative of the support provided with 81% agreeing that teaching facilitators have been supportive.

SS8 outlined facilitators "*would email after the meetings timeslot had ended to make sure we were okay or if we had any questions. It was outside the paid hours and job description and very much appreciated to get that connectivity in the online learning world.*"

Mixed experiences were reported when it came to planning and implementation of assessment in the digital space. FG1 reported that students were asked to record presentations as live presentations were not feasible due to logistical issues. In this case, the marking rubric was the "*same in terms of visual composition and content but body language didn't come into it*" (FG1).

Therefore, the grading of assessments, and in particular the participation component, was deemed more challenging in the online environment. As FG6 states "*You know, cameras were off, and it was difficult to decipher or to know really how much the students was [sic] engaged with it.*" While this is far from a unanimous endorsement, our survey results indicate a majority agreed with the statement "*Online E/PBL is an effective method of learning for students.*"

3.4 Theme 4: The student experience.

Quantitative data examining student overall enjoyment of online E/PBL revealed that many students welcomed this new approach (55%) and despite the challenges, most students (77%) learned well in this new online learning environment. When given a choice, many students (48%) would prefer a blended approach to E/PBL over a face-to-face approach (43%) or exclusively online approach (9%) (See Figure 2).

The successful student.

Qualitatively, facilitators discussed the attributes of successful students in online environment, whose characteristics were perceived to be broadly in line with a successful student in the face-to-face equivalent. This included being positive, engaged, and proactive learner. As FG3 points out "*[…] if you're going to wait for other people to make things happen that's not helpful. It's not helpful in face- to-face. And it's certainly not helpful when there are challenges like we had with the online [world]*". As outlined by FWR2 the successful student is "*not much different from a good student in 'normal' times. They are prepared, adaptable, attend class and work hard*".

Figure 2: Facilitator and student preferences regarding integration of E/PBL into the curriculum.
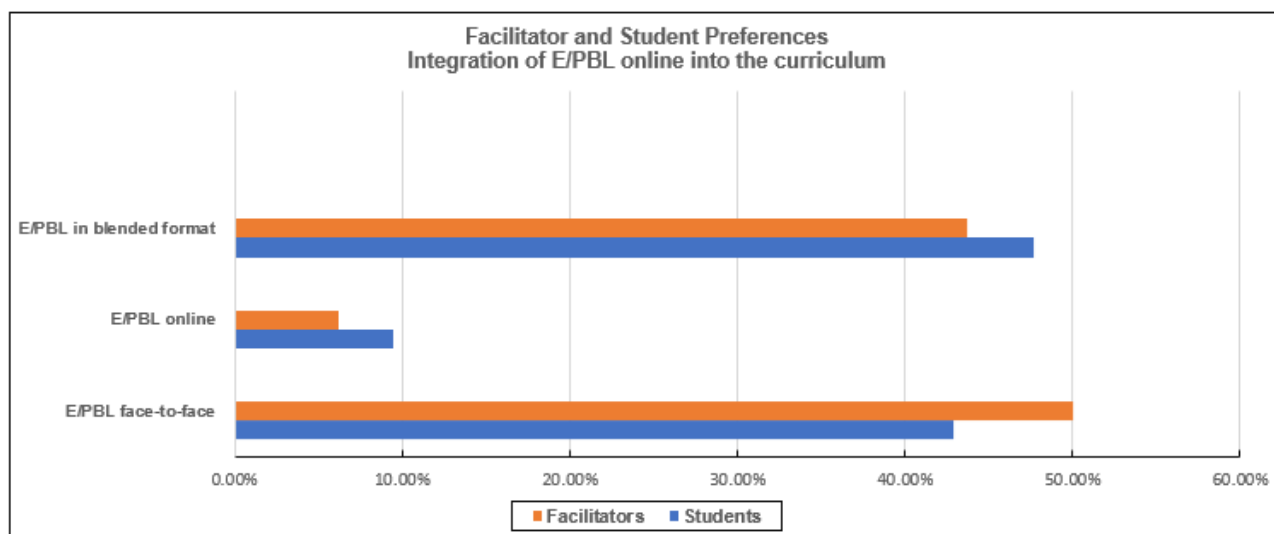
The impact of external variables.

There was acknowledgement of external variables which could undermine performance in an online environment. One facilitator delineated how the online environment compounded the gap between the capable and less capable students. FS13 outlined that "*the effectiveness of online PBL varied widely among students. Capable students had no problem while less capable students struggled, I think this widened the gap between the strong and weak students*".

As captured by FG6 *"[…] with online learning there are so many variables outside of our circle of our control. […] People [are] moving around and maybe sharing spaces or [are] maybe in a bedroom all day looking at a laptop. So, there was a whole load of other variables that could influence individual students' experiences in terms of their success.*" Furthermore, a successful student in an online environment requires support to enhance digital skills. As FS16 points out, online E/PBL would be more effective if "*more practice [is provided] for both teachers and students to use more [digital] tools effectively.*"

Influence of online E/PBL on social presence.

In the context of a pandemic, student feedback to facilitators indicated that online E/PBL afforded a social opportunity for students to work together collaboratively. The student participants appreciated the opportunity to interact with other students, which is not afforded by didactic teaching online. As SG1 outlined "*And like it was quarantine. I'm pretty sure all of us*

just wanted to talk to people. It was just a way of making your voice heard" and SS8 who reported "*in a year of online learning in rural Ireland it was the most social activity given for any modules during [the] COVID-19 move to online.*"

This social presence online was strengthened by establishing private group chats on social media platforms such as "*Snapchat®*" (FG1). However, in comparison to face-to-face learning, facilitators perceived less social presence and a perceived absence of informal socially orientated discussions, which are perceived as critical to the learning process and fundamental to E/PBL. FG4 reported that was "*better camaraderie and more participation from everybody in the group*" when facilitating face-to-face E/PBL.

FG3 maintained that they were unable to counteract the diminished social presence of the online tutorial environment stating "*we weren't able to compensate. I don't think for all of our efforts to compensate for that loss of connection, you know connection real time and real person connection.*"

4.   Discussion.

While there have been significant numbers of recent publications addressing the '*pivot*' to online teaching and learning spurred by the COVID-19 pandemic, there has been little work specifically examining its impact on experiences of enquiry/problem-based learning. The current study was designed to investigate experiences of this accelerated transition, and how they might inform the implementation of delivery for E/PBL in digital spaces in the future. As Lockee (2021, p.5) points out, we have an opportunity to "*reimagine how education could be delivered.*" Indeed, while the emphasis in the present study has been on the effects of the '*pivot*' in E/PBL, our findings touch on issues that are quite general across Higher Education in digital spaces. The results of our study indicate that there were challenges faced by both facilitators and students in the sudden transition to fully online delivery during the pandemic.

The first theme, Navigating Digital Tools identified mismatches between perceptions of facilitators and students regarding online learning tools, the competencies to use those tools, but also effective actions to mitigate some problems. Similar to patterns noted by authors such as Bumblauska & Vyas (2021), Koumachi (2019) and Manini et al., (2021), facilitators expected students to be "*digital natives*", having high levels of digital literacy that, in fact, the students did not possess. Similar to Zhao et al., (2021) and Basilotta-Gómez-Pablos et al., (2022) students demonstrated basic levels of digital competence and expressed a need for explicit support in

developing this skillset. This suggests that existing digital literacy plans within the participating HEIs were not fit for the suddenness of the move, despite the popularity of digital spaces developing even before the pandemic (Savin-Baden & Bhakta, 2019).

Digital competences, however, were not purely technical. While breakout room functions were considered to have high functionality by facilitators, students noted frustration with them due to lack of participation. Structuring those groupwork activities socially – by providing specific roles in line with the model of E/PBL (Barrett & Moore, 2011) – was identified as a useful support to engagement by students. This suggests value in noting that competencies are about fit between activity and tool, rather than just limitations of either the tool alone, or the user's capability. It re-enforces the importance of allocating roles at the commencement of E/PBL tutorials to better facilitate engagement (Archuleta-Moon, 2014) and the centrality of the social, collaborative nature of E/PBL learning (Hung et al., 2019).

The second theme, Adaptation to Online E/PBL addressed how peculiarities of this mode of learning interacted with the sudden transition online, and people's experiences of it. Unsurprisingly, both facilitators and students felt unprepared, and availability of dedicated technical staff affected facilitator's stress, but facilitators also noted adapting relatively promptly.

One of the most notable pressures was the need for increased active engagement by the facilitator with online activities. This is somewhat in tension with the principles of E/PBL as a student-driven process (O' Leary et al., 2023; McAllister et al., 2014). Our participants described the increased importance of giving and receiving feedback from facilitator, given the suppressed levels of student active participation.

The E/PBL tutorial was the focus of the third theme we identified arising, in terms of setting expectations, structure, and assessment procedures. Our findings partially replicate and support other recent studies such as Coiado et al., (2020), arguing that facilitators have a greater role to play in managing online tutorial group than in-person environments.

The complexity of student engagement in tutorials is demonstrated by the conflicting affordances of different parallel channels of communication in online environments.

On the one hand, some students reporting being more likely to interact, and greater comfort given the availability of text-based chat functions. Facilitators recognised the value of anonymity in supporting engagement from students who might otherwise tend to stay quiet. Despite clear facilitator preferences for cameras to be on and students visibly participating, many students

preferred to keep cameras off (as also reported by Castelli & Sarvary, 2021). The interaction dynamics of the online E/PBL tutorial are quite distinct from the in-person one, having separate channels with different enabling and constraining characteristics. A simple recreation of in-person tutorial models is not adequate for online activities, but opportunities exist to take advantage of different modalities of interaction to support diverse means of participation, in keeping with the collaborative and self-regulated mode of learning inherent in E/PBL (Donnelly, 2013; Yew & Schmidt, 2012).

Finally, the fourth theme addressed The Student Experience. It is evident that the transition to online learning requires learners to become more self-directed and collaborative while developing their digital skills (Foo et al., 2021; Kolbaek, 2018). The pressures of the sudden transition brought to the fore considerations of equity and access which were not quite as apparent beforehand.

Our results align with those of Zizka and Probst (2023) who showed that business students had mixed perceptions regarding their learning environments – diversity of experience, rather than homogeneity, was the rule across traditional, blended, or online. Indeed, a consistent pattern across participants in the present study was a shared awareness of the difficulty of the situation, but with inconsistent expectations and awareness of the effort and capabilities of others. This is apparent in the students' frustrations with tools and facilitator preparations, and in facilitators' surprise and tensions around students' participation and capabilities. This would seem to warrant a more widespread and greater degree of dialogue between facilitators and students about what needs to be done, in order to collaborate on how it can be done most effectively. The benefit noted that social interventions can overcome potential technical limitations – that dedicated tutorial roles can support participation when the limits of video conferencing suppress it – is an important one. Student experience is governed neither by technical nor social aspects alone, but by both. Students often have a wider variety of capabilities than those being catered for by the formal tools of the HEI (e.g., preferring to use private communication channels with which they are already familiar), which also affects how they prefer to be socially present online. Greater dialogue between staff, institutions, and students on how learning outcomes are to be achieved is entirely within the principles of the student-centred learning methodologies of E/PBL and warrants a wider conversation across the sector, to make the most of the possible benefits of online learning.

5.   Conclusion.

Investigating the rapid transition to an online teaching and learning environment that facilitators and students engaged in E/PBL faced during COVID-19 revealed several specific themes and challenges. A two-phased mixed methods approach encapsulated both quantitative and qualitative data of the facilitators and students; it presented some crucial insights into how E/PBL teaching and learning was perceived during the 2020/2021 academic year in the midst of the COVID-19 pandemic, and what lessons we can learn for more effective online learning, particularly of E/PBL, in the future.

It is clear that the environment for E/PBL (online or in-person) influences student communication and engagement. Digital tools can be combined with key characteristics associated with E/ PBL to promote students to develop real world critical thinking and reasoning skills while nurturing self-directed learning and engendering students' motivation and intellectual curiosity. Indeed, these findings may have implications for experience of digitally mediated learning more broadly as it remains much more common than it was prior to pandemic constraints. This is particularly the case with regards to, communication regarding tools and expectations between learners and facilitators, the usefulness of structured roles in collaborative activities, and maintenance of communication and collaboration in otherwise self-regulated learning.

6.   References.

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