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Identifying the Supports to Foster Teachers' Development of Learning Design Practices

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Abstract: In traditional classrooms worldwide, one of the most common strategies is lecturing, sometimes with the help of technology tools. An important barrier to the effective integration of information and communication technologies (ICT) has been identified to be the inability of teachers in creating effective student-centered learning designs. To foster teachers' learning design practices, there is a need to understand the supports that teachers need. In this study, we conducted teacher interviews to identify the types of supports that teachers need for designing effective student-centered learning designs within their context. Our findings convey that teachers need learning design support towards creation, contextualization and collaboration. These findings may stimulate momentum for further attention to researchers involved with learning design frameworks and tools development.

Keywords: Learning Design, ICT integration, lesson planning, design thinking, teacher education, learning design tool, teacher needs, technology enhanced learning

1. Introduction

Learning design (LD) is a complex and integrated process, which includes different stages i.e., planning, designing, orchestrating, and running sequences of teaching and learning activities (Dobozy & Cameron, 2018). School teachers are reported to have difficulty in designing learner-centric learning designs (LDs) with ICT integration. Tsai & Chai (2012) argue that teachers' lack of design thinking is the crucial "third-order barrier" to technology integration. Hence, we need to focus on enhancing teachers' design thinking skills. Design thinking is defined as the 'dynamic creation of knowledge and practice' by the teachers in response to the pedagogical affordances provided by the ICT tools (Tsai & Chai, 2012). As classroom context and students are dynamic, the teacher should rely on design thinking to re-organise or create learning materials and activities, adapting to the instructional needs of different contexts or varying groups of learners. However, the enhancement of design thinking for teachers is not a significant component of typical teacher education programs.

Learning design has emerged as an important issue with research and development work focused on ways in which teachers can be supported to design learning experiences for students. Aiming to support teachers to represent their teaching ideas, a variety of strategies have been implemented, such as learning design tools that attempt to provide designers with some form of guidance and support around their design practice (Conole & Willis, 2013), training programs and workshops (Persico and Pozzi, 2013), community-based platforms to share knowledge (Prieto, et al., 2014) and so on. Yet there is an incomplete understanding behind the lack of adoption of studentcentered learning design practices (Mor & Mogilevsky, 2013; Prieto et al., 2014; Boloudakis, Retalis & Psaromiligkos, 2018; Mor et al., 2013). To find suitable ways to foster school teachers' development of learning design practice, there is a need for further research to identify the supports teachers require in designing effective learner centric LDs in their context.

2. Background and Literature Review

Reviews related to barriers to ICT integration in the classroom reported that there are three types of barriers (Dexter et al. 2002; Ertmer 1999; Judson 2006). The first-order barriers are external to the teacher (resources, institutions, subject culture, and assessment) and two second-order barriers are internal to teachers (teacher attitudes and beliefs, and knowledge and skills). First-order barriers wereseen as less significant than second-order ones. As academic researchers, first-order barriers are often not in our hands. In recent decades, much research has been done on second-order barriers, which has led to exploring several dimensions associated with teacher attitudes, beliefs, knowledge, and skills. Tsai & Chang (2012) observes that teachers' lack of design thinking has been identified as an essential barrier i.e., "third-order barrier" for technology integration. "It is essential to have teachers see the value of design thinking in their classrooms, and the connection between design and the academic goals of the classroom needed" (Carroll et al., 2010). Thus, the broad problem is related to the ineffectiveness of ICT integration by teachers. This is due to their inability to design effective teaching-learning activities with ICT. This preliminary study was designed to understand the support that teachers require so that they may design effective LDs.

Multiple solutions have been developed to address the issue of the lack of design thinking among teachers. These include teachers training programs and workshops (Lakkala & Ilomäki, 2015), online portals for sharing best practices (Shaffer et al., 2011), teaching frameworks and guidelines (Biggs, 1996; Howland et al., 2012; Sorva, Karavirta, & Malmi, 2013), and learning design frameworks (Conole, 2014; Laurillard, 2013) and tools (Laurillard, 2012; Lukasiak et al., 2005). Such workshops have been reported to be insufficient in improving teachers' ability to design effective LDs (Conole & Alevizou, 2010).

Celik & Magoulas (2016) conducted a literature review on teachers' perceptions, practices, and needs of LD tools, yet there is limited understanding of teachers' perceptions of these tools and of their design practices while using them. There is also no clear understanding of the reasons behind the lack of adoption of LD tools among teachers (Mor & Mogilevsky, 2013; Boloudakis, Retalis & Psaromiligkos, 2018) or of the platform features that could mostly appeal to the teacher community (Prieto, et al., 2014). LD tools have been developed to provide computer-aided support to the LD process, aiming to make pedagogical decisions explicit and provide computer-interpretable visualization/representations of the designs (Prieto, et al., 2014). Although teacher training acknowledges that pre-service and novice teachers should be trained in LD approaches (Persico and Pozzi, 2013), the way LD tools can be incorporated in their training to support the development of a common understanding of LD issues remains a challenging problem (Papanikolaou, Makri and Roussos, 2017). For example, teachers find it difficult to translate theory into practice (Laurillard, 2012) or customize best practices for their own context (Schaffer et al., 2011). However, for our solution to be relevant to our target users, we needed to analyze the problem in our research context and identify where in the LD creation process teachers needed support.

Bennett et al. (2015) explored the support that helped university teachers' in their design processes. They identified teachers' perceptions of their student characteristics, their own beliefs and experiences about teaching and learning, and contextual factors as crucial influences on design decisions. They also suggested other supports like improving teachers' knowledge of students, sharing practices, providing guidance about pedagogical theory, and enabling flexibility in design processes and within designs themselves. Support tools have the most potential in improving design decisions by engaging with these crucial influences that shape existing design practices. In the same line, Arpetti, Baranauskas & Leo (2014) explored as needs or in the form of requirements by the teachers themselves regarding learning design practices and representations. The result revealed that support for reflection, considering educational needs of learners, ease of use, economy in terms of time, reuse of designs and support to design were the most important, sharing of designs practice was as neutral, whereas software compatibility, graphical representation of designs, collaboration, author identification, aesthetics (look and feel of the software) meant to be less important requirements for teachers for learning design.

Conole (2014) explored the support for teachers that were derived from the evaluation of learning design tools. Flexibility is found to be a desirable feature for adapting designs to different educational contexts and teachers showed as a positive aspect in the evaluation of an LD tool, Support for reuse and

adaptation of designs practice seems to be preferred to the creation of new designs. Usability is one of the most commonly valued parameters in the evaluation studies. Textual representation of designs is valued by teachers when this aspect is explored during the evaluation of a tool.

Dagnino et al. (2018) conducted a systematic review where they identified and categorized different types of support that teachers require for different learning designs. The categories of teachers' needs were as follows : Flexibility in terms of reuse of designs and their revision and adaptation to educational needs and also in the design process but, at the same time, provide guidance; Support theretrieval of existing designs and mediate their adaptation; Support for co-operation amongst teachers in terms of a peer evaluation and to share one's own design for commenting or collaborative editing; Support for reflection by providing the design in graphical or textual format in every moment during and after the design phase; Ease of use ranging from easily fillable templates for teachers without having technical skills; economy in terms of time; Textual and graphical representation and Activate design thinking processes teachers are familiar with based on the teachers' and institutional design culture.

This review of literature and analysis of LD tools helped us identify different supports. These categories of supports would be used to help our coding in the research studies within Indian contexts.

3. Methodology

The research question that we investigate in this study is: *What supports do teachers require for designing effective learner-centric LDs while integrating ICT in the classroom?*

This study used a qualitative approach where we conducted a needs analysis of teachers via interviews. Thematic analysis was done for analysis of the interviews data.

3.1 Participants and Data Collection

This study began in late 2021 and the target population for this study was pre-service and in-service secondary level teachers from different types of schools (government, government aided-private, and unaided-private) in Delhi, who use ICT in their teaching learning. The exact target audience for the study is yet to be decided. The participants for this study were chosen based on the convenient sampling. Teachers from different schools of the Delhi region in this study were contacted through email and phone calls. Data collection included semi-structured interviews which including teacher reflections or experiences. We selected teachers, who showed interest in participating in the study. The study is ongoing and so far we have interviewed 6 teachers, 3 in-services and 3 pre-service out of 4 male and 2 female participants. Their academic disciplines were from sciences, social science, mathematics, languages. The majority, 83.33%, had not used any learning design tool before the study, while 16.66% had. Our plan for the study is to interview 10-15 more teachers.

We conducted semi-structured interviews with the participants. The interview protocol was designed in such a way to elicit the challenges faced by teachers in learning design through experiences of the teachers. We also tried to understand teachers' support required for designing effective learnercentric learning design while ICT integration in the Indian classroom. Interviews were conducted over the GMeet platform in the English and Hindi language and took approximately 1 hour. Follow up clarifications were sought via phone calls. All interviews were videotaped for further analysis. Personally identifiable data were anonymized immediately after data collection. Sample interview questions included:

- How do you develop lesson plans?
- What problems did you face in lesson planning for the class?
- Do you collaborate at any point of planning – do you co-create or share or both? If not, why?
- Have you reflected over your lesson plan? Explain any instance when you reflected on your lesson plan? How do you reflect on your own lesson?
- How much of your pre-service training helped you in creating learning designs? Where did you struggle more? Have you found a solution?

3.2 Data Analysis

The recorded interviews audio responses were transcribed into verbatim in English text with the help of an online meeting transcriber. Additionally, the transcribed non-English text was translated into English for further analysis. Thematic analysis (Braun & Clarke, 2012) was used as a 'coding frame' for structuring transcribed data. Data analysis involved identification of themes related to support that teachers require for designing effective learner-centric LDs while ICT integration. This was followed by familiarizing with the data and generating initial codes. Firstly, the collected data were coded, edited, consolidated, and entered into a master sheet. During this phase, the highlighting of the phrases andsentences were done and then the themes were named and defined. The data collected from the respondents were coded based on the themes and analyzed the data based on them.

4. Findings

From the thematic analysis, eight themes were identified as follows:

- *Templates / Prompts:* Learning designs provided with prompts that can be easily filled by teachers without specific technical skills.
- *Basket of strategies:* Learning designs that were provided must have sets/samples of lessons on the same topic with different strategies.
- *Review/ Comparison mechanism:* Existing learning designs provided that help in building new learning designs or reviewing new designs.
- *Reusability:* Learning designs that were provided were readily understood, adapted and reused by teachers in their context. Teachers were able to effectively adapt and reuse previously documented learning designs according to their own needs.
- *Understanding students' needs:* Learning designs must cater to the needs of the learners.
- *Relatable examples/content in context:* Learning designs must provide specific examples that are related to the context of the learners.
- *Expert/Mentor support:* Learning designs must provide a mechanism for expert feedback.
- *Peer-support:* Learning designs were created with support of peers like collaborating to create new designs or to review designs of their peers.

There were patterns of themes, so we grouped into categories based on the similarities. The three categories emerged as: creation, contextualization, and collaboration in Table 1.

Table 1. *Details of themes emerged from empirical evidences*

Categories	**Themes**	**Illustrative evidence**
Creation	1. Templates / Prompts 2. Basket of strategies 3. Review/Comparison mechanism 4. Reusability	**Teacher 4:** "Every *day we have to make at least two lesson plans and for the same lessons we have to make teaching learning material also, this process is so tedious for us. So we want something like ready to use templates that we customize for us."* ***Teacher 5:*** *"Sometimes we feel whatever we prepare for class, it does not work. So, we think that we can make different lesson plans for the same topic by using different strategies. But it is not possible on a regular basis.* ***Teacher 6:*** *"During teaching practice, the mentor asked us to prepare a lesson on a particular topic and then provide one standard lesson to us to review/compare our own lesson that help in designing our lesson in more effective way"* **Teacher 1: "***Our mentors provide some standard templates of lesson plan or itself lesson plan for our reference"*
Contextualization	5. Understanding students' needs 6. Relatable examples/ Content in Context	**Teacher 2:** *"We have already designed lesson plans from the past year, but when we go to school we find students with different backgrounds and the lesson plan does not seem to fulfill the needs of different students. So sometimes we use the lesson plan as it is or refine it and use it according to the students' needs."* **Teacher 5:** *"Sometimes our mentor suggests using lesson plans that are made by our seniors that are available in the department. But it does not fit our students like there is no coherence between two lesson plans, examples are not fitted*
		in my lesson plan."
Collaboration	7. Expert/ Mentor support 8. Peer- support	**Teacher 3:** *"We are just trainee teachers; we feel that whatever lessons we make are novice. So we feel that either experts / mentors will review it before teaching into the actual classroom. Based on their feedback we can modify our lesson and perform better in the classroom."* **Teacher 4:** "*During micro-teaching practice, our peers also review lesson plans that build our confidence."*

5. Discussion

This paper describes a study on needs analysis of teachers to address the supports that teachers need while designing learner-centric LDs. The study conducted among school teachers in Delhi, India has shown a different range of supports required by the teachers in designing effective learner-centric LDs. We have found that teachers require ample support towards creation, contextualization of the LDs and also provinces for effective collaboration in LDs creation.

The findings of this study align with previous research on teacher support required for the creation of LDs. A study by Dagnino (2018) asserts that teachers need ready-to-use design templates and flexibility in terms of pedagogical choices in structuring a learning design. In our study, the teachers stated the requirement of the availability of different templates aligned with the pedagogical goals of the particular lesson for the teachers to choose from. The teachers also demonstrated the need to be prompted in learning design that can be easily filled by teachers without specific technical skills. Moreover, our teachers needed support that could enable them to effectively select, apply and adapt previously documented learning designs according to their own needs.

Teachers in our study were open to support required in terms of conceptualizing and applying the learners' context. Notably, some teachers spoke about approaching learning design by considering students' needs, interests and tailor the resources and the activities around their interests or their motivations. Such efforts to 'get to know' students are reported to be a consistent theme in the study conducted by Bennett et.al (2015) wherein teachers built up a profile of their students over time and identified the needs of their students by their perceived characteristics and their academic performance. This information influenced how teachers designed their lessons and how they adapted those designs to suit the evolving profiles of their students. According to Agostinho et.al (2013), the contextualized description was deemed as a useful support in the design process. Bennett et al (2004) suggest that the contextual detail included in a learning design adds to its reusability.

With respect to support for collaboration, a majority of teachers in our study mentioned that mentor feedback often prompted them to rethink particular areas of their design. In addition, teachers reflect and redesign or refine their designs over time. Their feedback gives probably as many ideas about how to adjust and change and adapt their design. Similarly, in the study conducted by Agostinho et. al (2013), learning designs can be seen as a way to generate and inspire ideas and provide models of good practice against which teachers can compare their own design thinking and work. Comparing the design ideas of teachers' work against their chosen learning design provided teachers with an indication of 'quality' of their designs and some participants reported this comparison gave them more confidence in teachers' abilities and knowledge as a designer. In the study by Dagnino et al (2018), the opportunity to obtain a peer evaluation of a developed LD creation was positively considered by the teachers.

The findings from this study contribute to expanding the support required for designing learner-centric LDs. These findings have implications to researchers working on learning design with integration of technology in the classroom and teacher professional development. This study's context also reports the trajectory to develop rich learning design experience to Indian teachers.

The limitations of this study include the small sample of participants, the limited insights provided by the open-ended question, and there is no utilization of any learning design tool. Our current study did not evaluate any tool. Also, it may yield ample insights if, analysis of support for LDs creation provided by evaluating existing learning design tools. Moreover, provide comprehensive understanding of support required by teachers for LDs creation may develop if qualitative data and quantitative data both included. A future research design may provide participants with a richer design experience if digital learning design tools are used.

6. Conclusion

Supporting teachers to represent their teaching ideas into design has attracted researchers' interest in developing learning design tools that provide some form of guidance around the design practice. This paper reports on a study in a teacher education context as fostering learning design practices. Our work involves investigating the support that teachers' needs for learning design to achieve an overall perspective of teachers' needs during the learning design process.

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