

Sustaining students' interest in an instructional system design course by leveraging interest-driven creator theory

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Abstract: In semester-long courses, the trajectory of students' interest hits multiple highs and lows as the course progresses. In general, sustaining students' interest is a challenge, which becomes even more important when there is a real-world project with an expected deliverable. This study emphasizes investigating how instructors' strategies help in sustaining students' interest in instructional system design (ISD) course. The course participants developed a real-world project involving training resources for sensitization about the needs and challenges of persons with disabilities (PwD) in an educational institute. We have analyzed interview data of fifteen students and one instructor, survey data of the same students, and In-class observations by researchers. We have identified instructors' strategies which were implemented thoughtfully and supported by interest-driven creator (IDC) theory. We have mapped indicators from student responses to the components of the interest cycle i.e. triggering, immersing, and extending. The findings of the study show that course strategies supported by IDC theory played an important role in sustaining the students' interest throughout the ISD course while ensuring both conceptual learning and project execution.

Keywords: Interest, Instructional systems design (ISD), Interest-driven creator (IDC) theory, project-based learning, persons with disabilities (PwD)

1. Introduction

Design is a process of engaging in a disciplined inquiry for creating something new with practical utility. Instructional design (ID) is a subset of design, directed toward the practical purpose of learning (Rowland, 1993). A typical instructional system design course covers a conceptual understanding of instructional design (ID) models, application of the models, understanding of different aspects of an ID project execution, etc. In instructional design, it's important that students not only understand the concepts but should also be able to follow and carry out the processes outlined in a model (for example, analysis, design, development, implementation, and evaluation in the ADDIE cycle). To achieve this, many instructional system design (ISD) courses follow a project-based learning approach where students get an opportunity to apply and test their conceptual understanding. In project-based learning, students engage with the problem, learn by doing, discuss, and apply ideas to solve the problem given to them. This increases students' engagement and helps them to develop a deeper understanding of important ideas by facilitating opportunities for problem-solving, decision-making, and explaining their ideas (Krajcik & Shin, 2014). However, in a semester-long project students' interest keeps varying due to various reasons, and possibly students might end up losing interest. Sustaining students' interest in a semester-long project becomes a key challenge. The blind emphasis given to exams or tests acts as an impediment to the learning process where students miss the opportunity to develop an interest in the subject material and don't prepare for ill-structured real-world problems (Chan et al, 2018).

In spring 2023, the ISD course instructor from a premium educational institute in India proposed a real-world problem of designing a training website for the awareness and sensitization of the institute community towards the challenges and needs of persons with

disability (PwD). Rohm et al (2021) suggest that the authentic real-world problems selected in project-based learning give more relevant learning opportunities to the students. The PwD project was highly relevant for ISD course students and involved stakeholders within the immediate social spheres of students in the institute. The real-time usability of a project by the institute community and the opportunity to make an impact at scale could catalyze students' interest in the course and project. The PwD project was real-world in nature and demanded a high level of interest and time to execute tasks and achieve a certain level of learning. Thus, the interest-driven creator (IDC) theory was chosen as a suitable basis for the project execution in the ISD course.

Interest is an important component of learning and it is conceptualized as an affective state which can arise from situational triggers (Ainley, 2006). Improved learners' interest in the topics can make learning easier, more effective, and more enjoyable. According to Chan et al (2018), learning as a process entails interest, creation, and habit, thus learners who develop the habits of creating out of interest will go on to become interest-driven creators. The IDC theory is useful to prepare learners for ill-structured and unpredictable real-world problems (Chan et al, 2018). The interest loop of IDC theory contains three components that are important in sustaining interest. The first component is "triggering interest," which is facilitating a task that sparks initial interest in learning, the second component is "immersing" learners in learning activities that capture students' attention and put them in a state of flow, and the third component of the interest loop is "extending" which involve activities to extend learners' interest refers to integration of prior and new knowledge in learning activities (Wong et al., 2020). The IDC theory further talks about the create loop that includes imitating existing knowledge, combining different concepts to generate new ideas, and staging the work for getting feedback from peers (Chan et al., 2018). The third anchored concept in IDC is the habit loop consisting of a cuing environment to automate behavior, the routine of repetitive behavioral patterns, and harmony as a result of habit activation (Wong et al., 2020). However, the scope of this paper is limited to students' interest loop hence we will be focusing on how the course-level instructors' strategies helped in sustaining students' interest in ISD course.

The research study was set in the premise of the ISD course where research and teaching assistants observed the creation and development of the PwD project (website) as an outcome of students' interest throughout the semester. The research question (RQ) under investigation is-How did the course level instructors' strategies help in sustaining students' interest? To strengthen and validate our observations, we identified the indicators of students' sustained interest through interviews (with students and instructor), self-report surveys, and In-class observations by researchers.

2. Related Work and Theoretical Basis

To prepare students for the future challenges, the what, why, and how of learning needs to change. An inevitable and permanent change is taking place in learning as it moves from teacher-centered to student-centered learning. Learning becomes enjoyable and effective when students learn with interest, creation further makes learning productive and successful, and instilling the habits of creating with interest can lead to students becoming lifelong interest-driven creators (Chan et al., 2018). Thus, IDC theory focuses on three anchored concepts: interest, creation, and habit. In The Merriam–Webster's Dictionary "interest" is defined as "a feeling of wanting to learn more about something or to be involved in something," It has been argued that interest is crucial in guiding behavior and attention and that it promotes learning and inspires effort (Dewey, J. 1913).

The four-phase model for interest development specifies the following phase: triggered situational interest, maintained situational interest, emerging individual interest, and well-developed individual interest (Hidi & Renninger, 2006). Loosely mapped to these phases, the IDC theory proposed a three-component "interest loop" to guide the development of a coherent learning process: triggering interest, immersing interest, and extending interest (Chan et al., 2018). "Curiosity" for triggering interest, "flow" for immersing interest, and "meaningfulness" for extending interest were proposed as suitable indicators by

Wong et al, 2020 with a goal of explaining design factors to be taken into account for early interest development. The action words—triggering, immersing, and extending, call for educators to use them as springboards for student-centered learning that results in deeper immersion in students' interests (Roschelle & Burke, 2019).

IDC theory has been implemented in different regions throughout Asia. In Malaysia, IDC was implemented in educational technology courses for instilling innovativeness among learners (Khambari, 2019) and ignite students' interest in educational technology (Wong et al, 2020). In Taiwan, IDC has been implemented in an experimental school with subjects reading, writing, math, science, English language, and social studies (Wong & Wong, 2019). Kong (2006) used IDC theory to develop computational thinking for K-12 learners. IDC provides a theory of learning design for Asia, hypothesizing that learning activities that are created using the IDC approach will help students become more interested in learning, immerse in the creation process, and reinforce their habit of creating (Chan et al., 2018). This brings us to the fit of IDC to our own context, where the goal was to create training resources for the institute community to improve sensitization and awareness about the needs and challenges of PwD as a real-world ID project. We have used IDC theory for sustaining students' interest in a semester-long course on instructional system design (ISD).

3. Course Design and Orchestration

Instructional system design (ISD) is a post-graduate level course in the curriculum of the educational technology master and doctoral program. This 6-credit, semester-long course typically covers instructional design (ID) models, tools, and technologies for creating instructional materials, processes followed in ID projects for developing instructional materials, etc. The learning outcome of this course is to enable students to apply given instructional design models. The latest offering of the ISD course was in January 2023 having a total of 22 students registered. Students were categorized into 3 categories- credit, audit and sit through based on their prior experience with the ISD course and registration status. Freshman students attending the course for the first time and to be graded were called credit students. Senior students attending the ISD course for the first time and fulfilling all the course and project requirements except formal grading were called audit students. Students who have attended the course previously, but volunteered to participate in the course and project out of interest were given the role of mentors and called the sit-through students.

The course was delivered in physical mode with a hybrid set-up for smooth execution of the multi-cohort setting. As the course was run in a hybrid setup, the Zoom video conferencing platform was used for synchronous class sessions. Total of 14 classes of 3 hours each were conducted over a period of sixteen weeks. Weekly 3 hours of class time were allotted for both conceptual learning and project work. For the conceptual classes, one classroom was occupied by all students for 3 hours. For the group work activities under the PwD project, 4 different rooms were set up for each group to collaborate with group members. One dedicated research assistant was assigned in each class to record class observations. The physical group work was video recorded and an online meeting was also recorded on the Zoom platform. The recording of data and observations were managed by the research and teaching assistants throughout the course.

Various break-out activities were designed by the instructor for facilitating group discussions during class hours. In each class, 20-30 minutes were reserved for presentations and updates by groups followed by feedback and suggestions by the instructor and students. The instructor has organized three feedback/interaction sessions with subject matter experts (SME), and PwD persons from the institute. The instructor and course team has also organized a 3-hour long workshop by leading organizations in the field of PwD rehabilitation in order to facilitate a deeper understanding of the needs and challenges of PwDs. The class was divided into 4 groups each working on a different type of disability to be covered under the PwD project (website). Figure 1 depicts the different topics covered under each module of the PwD website and the corresponding group composition.

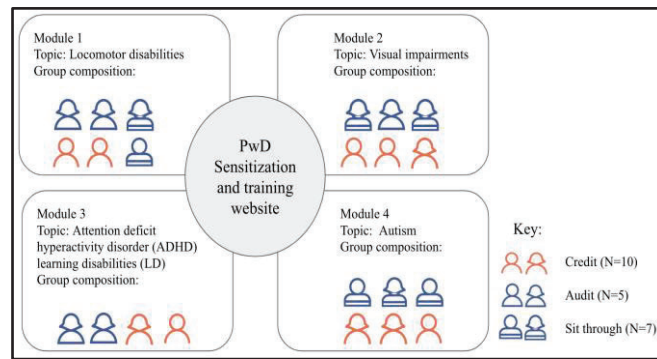


Figure 1. Types of disabilities covered under the PwD website and group composition

For adding instructional material under each topic, a template that emerged as a result of the class discussion was followed. Each group has used suitable elements for presenting a certain type of content, for example using a poster to depict challenges and support strategies. Combining the inputs and elements proposed by each group, a common template was proposed by the course team for maintaining structural uniformity across the topics. The template divided the website into four sections with the first section covering an introductory video of the topic e.g. “What is attention deficit hyperactivity disorder (ADHD) and learning disability (LD)?”. The second section includes a graphics interchange format (GIF) for depicting the point of view (POV) of a person with a disability. The third section would cover the challenges faced by persons with disability, in the form of a poster, and the fourth section covering support strategies for PwD persons in the institute. The project was situated in an educational institute hence, the key requirement was to contextualize the training resources keeping the institute set-up in mind.

4. Method

4.1 Participants and Data Collection

A total of 22 students registered for the course, of which, 10 students registered for credit, 5 students for audit, and 7 senior students attended the course in the “sit through” mode and contributed towards the PwD project. In the ISD course, stakeholders and end-users were closely connected with students through the PwD website project. Figure 2 gives an overview of the timeline and sources of data collected in the longitudinal study. The research assistants noted in-class observations throughout the course, from the IDC theory implementation perspective. To know the instructors' strategies to sustain interest in the ISD course, we conducted one semi-structured interview with the course instructor at the end of the course.

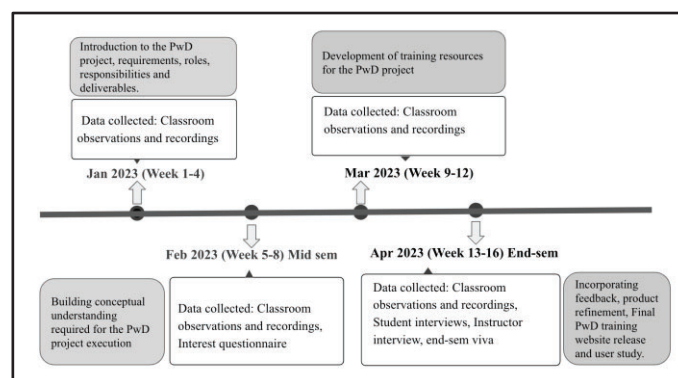


Figure 2: Timeline of course, project execution, and data collection

We have administered an Interest survey to understand students' interest in the course. Students' interest survey questionnaire, designed by a senior post-doctoral researcher who was also a course team member, was administered post-mid-sem exam. This interest survey consists of a total of 7 questions with 4 open-ended and 3 Likert scale questions. For the Likert scale questions, students were asked to respond on a scale of 1-5 corresponding to strongly agree to strongly disagree. We also conducted semi-structured interviews (after the end of the semester) with credit and audit students to understand their interest in the course and PwD project.

4.2 Data Analysis

The PwD project details and subtasks were priorly discussed with all the students in the class. All the ISD students were divided into four teams and each team had 4-6 members. Each team consisted of credit, audit, and sit-through students. For this study, we have sampled credit and audit students. To Investigate the students' sustained interest, we have analyzed responses from semi-structured interviews and one survey. The grounded theory approach in content analysis (Mayring, 2015, p. 16) was followed to analyze Interview and survey data. We have done deductive coding of the interview and survey responses. Three components of the interest cycle i.e. triggering, immersing, and extending were used as codes and we have mapped the students' responses to these codes. Extending the grounded theory approach in content analysis, we have analyzed instructors' interview responses to investigate the instructor's strategies. To gather additional insights about instructors' strategy implementation in the classroom and its impact on students' interest, we have analyzed observational data by researchers following the observational protocol approach (Mayring, 2015, p. 48). The analysis of observational data was exploratory in nature aiming to find more micro-level evidence from the classroom.

5. Findings

This section contains findings on how the course activities and instructors' strategies help in sustaining students' interest. Section 5.1 contains an episode showing students' interaction during a class discussion, mapped to different components of the interest loop. In section 5.2, Table 1 further shows course-level strategies applied by the instructor in the ISD course to sustain the student's interest in the course. In section 5.3, we show evidence of students' sustained interest, based on a self-reporting survey questionnaire and student interviews.

5.1 Students' Interest

The episode below depicts a classroom discussion between the students, where the instructor played the role of a facilitator. This is an example of a carefully designed activity where the instructor triggered students' interest in the task. In this case, it was the creation of training resources for the PwD website. The goal of this discussion was to attain clarity about the task students are about to undertake for the next few weeks. While doing so, the instructor also gave room for students to express their opinions and reach a common understanding for working towards the project goal. Figure 3 shows evidence from classroom discussion mapped to the components of the interest loop in IDC theory.

The instructor triggered a discussion by posing the following question prompt: *"What is a training resource? Can a brochure or a poster or FAQ be considered a training resource? If yes, under what conditions, and if no, why not? Okay, I don't have an answer. So that's why I'm throwing it open. So that we can collectively come up with an answer to what we are going to call training material. Okay, so this discussion has implications for what we create as material for the PwD cell."*

While putting forward the project requirements, the instructor also reiterated the broader learning goal beyond the project, which is learning ISD concepts through the project.

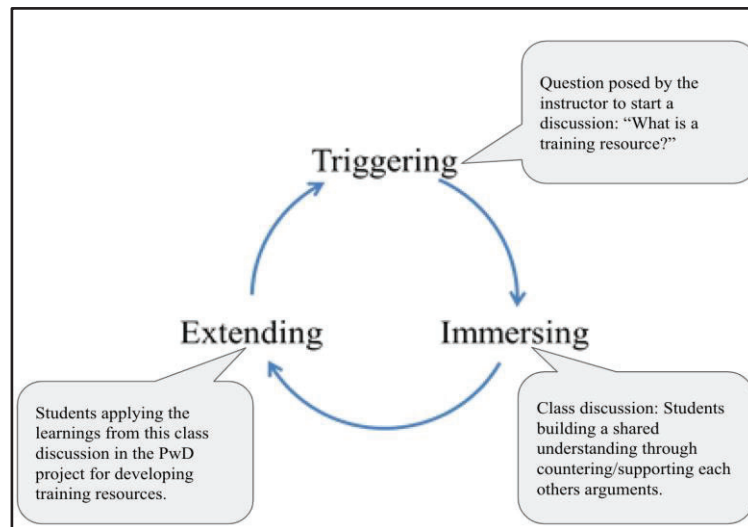


Figure 3: Components of interest cycle observed during a class discussion.

Above was the anchor question for the discussion and students started participating based on their prior knowledge. The goal of this discussion was to bring out students' thoughts and views on "What is a training resource?" and make them understand the contextual nature of training resources. Students were seen immersed in the discussion and here are some excerpts from the students' discourse:

S16: Training through the brochure or poster cannot be considered as a training resource but it depends on what is the title or theme of the poster. If it is a "how to" question then it can become a training resource.

S12: ..But a poster or brochure can't be a training module. It comes under awareness. So if it is for spreading awareness about PwD for people other than PwD then it can be considered as a training resource.

S18: I think a poster can be considered a training module depending on what you are trying to learn. For example: "How to use a printer"- a poster is sufficient training for that.

S5: I would like to counter that, yes, the instructions with any equipment or anything can be can be treated as a resource but I can't be considered training itself. Whatever comes along with the printer or the laptop, it's a set of instructions or FAQ, It's not training actually.

S19: I think it depends on the context. For example, during COVID situations, a lot of information was given in the form of instruction through the brochure, and they were kept in public places. Whereas, if the same thing is made in a different context, for example, "You do this so that you will learn how to ride a bicycle" So the instructions given are still instructions but can't be considered training. So it depends on the context.

Here, the instructor intervened and tried to steer the discussion by extending the point of context. Instructor suggested: "Okay, so let's pause here, for how to ride a bicycle. A poster is not a good training resource. Why? Because the training requires a hands-on and there is no hands-on. That is why it's not an appropriate training resource. Right. So, that is the point that we have to keep in mind, that it depends upon the purpose. What you have to do is design activities. Okay, so the point of this discussion is that, while we are creating material for the PwD cell, we have to keep asking ourselves this question, what is the purpose of this material? (The implications of this discussion were seen further, during the creation of training resources under the PwD project.)

5.2 Course Level Strategies and Their Effect on Students' Interest

We present a set of important strategies that were applied by the instructor during the ISD course, along with its goal and evidence that these strategies were useful for sustaining students' interest.

Table 1: *course level strategies applied by the instructor to sustain the students' interest*

Instructors' strategy and a targeted component of interest loop	Goal of the strategy	How this strategy helped in sustaining the interest
Real-world project: Selecting real-world PwD project with a high social value for the students and institute community. Component: Trigger	To involve the students in a semester-long PwD project	Having a real-world project with implications for stakeholders within the institute, helped students to see the value associated with the project.
Interactions with experts & stakeholders: Facilitating Interaction with subject matter experts (SMEs), PwD stakeholders, and experts from the PwD rehabilitation organization Component: Immerse	Students should understand the needs and expectations of stakeholders. Get feedback on work progress, and incorporate the feedback for content refinement.	Students expressed that the real-world nature of the PwD project in the ISD class has played an important role in keeping their interest at a high level. These interactions were perceived as ' <i>great motivations</i> ' by the students.
Group presentations: Arrange group presentations for peer and instructor feedback post each group activity. Component: Trigger & Immerse	All groups should be aware of the progress with respect to the bigger picture (the whole PwD website) and ideas should be shared to get more clarity	Many valuable suggestions came out of these presentations and discussions. Groups used to discuss challenges in front of their peers used to share potential solutions for the problem. Outcomes from those presentations contributed to the PwD website project. subtasks completion gave them a feeling of confidence and boosted their interest.
Flexibility in project scope & activities: Increasing or decreasing the scope of activities dynamically and deciding deadlines with mutual consensus Component: Immerse & Extend	Students should not be overwhelmed by the volume and/or complexity of work, so putting the task within their zone of proximal development to ensure students don't lose interest.	The PwD project required extra hours of work other than class time. Along with the extra time, it required some content development skills which students had to learn. By involving students in decision-making and discussions, the instructor ensured that the project progress is led and driven by students. This instilled a sense of responsibility and ownership, which helped in sustaining students' interest.

Homework 0: Asking for students' reflection after class in and addressing/discussing those points in the next class Component: Trigger, Immerse & Extend	Giving an opportunity to externalize and put forth the points/opinions. Making students aware of others' reflections and opinions. Facilitating reflection opportunities to students in asynchronous mode so the learning space remains dynamic.	Students shared that HW0 was like a knowledge-sharing platform, an interesting and encouraging activity they enjoyed. They could read others' views and were able to comment, hence the reflection activity facilitated the opportunity for the students to know others' views.
Clear goals: Mentioning the clear goal and deliverables Component: Trigger	To bring clarity among students about the nature of the PwD project, deliverables, roles and responsibilities, and time commitments.	Being aware of the goal from the beginning helped students to understand the expected time and effort for PwD project. Having clarity about why and how I should contribute to the course projects and what I will get out of it, helped the students maintain a high level of interest.
Productive digressions: Using digressions as a tool to discuss and connect interrelated knowledge components Component: Immerse & Extend	To connect other relevant topics with current ongoing topics.	Students expressed that digressions were fruitful for them as it was an opportunity to connect the interrelated topics and construct new knowledge on the basis of prior knowledge.

When asked about the rationale and thought process behind using these strategies, the instructor was quoted saying: *"The predominant approach here is to draw upon the knowledge that is present in the class already. So, any orchestration is centered around making people bring out their knowledge and realize that they already know something and also to listen to others and learn from them rather than the approach of the instructor imparting some knowledge."*

While explaining how these strategies were utilized for maintaining students' interest, the instructor mentioned: *"So, maintaining the interest of students is again a fairly challenging task. So, in the beginning, the interest is high and that is automatic, there is some intrinsic interest from the student side. But as the course progresses, a lot of detailing work has to be done. Because of that, it is inevitable that student interest will drop as the course progresses. So, the challenge there was to keep some variety so that the student interest is maintained. So for example, instead of doing all the stakeholder interviews in one shot, we kept looping in that you do something, analyze, reflect, and then do another interview so that each time even though it's the same project, there is some newness when they are talking to different people at different points of time in the course right. So that was one strategy to maintain interest."*

5.3 Indicators of Students' Sustained Interest

In this section, we have mapped the evidence of students' interest in the course to the specific components of the interest loop. This evidence is drawn from students' responses to the interest questionnaire (administered after mid-sem) and semi-structured interviews (conducted after end-sem). Given below is the evidence of students' interest viz triggering, immersing, and extending.

Triggering: Three major points were observed to be triggering the initial interest of students in the ISD course. These include, the course content being a valuable addition to students' knowledge as educational technology researchers, the PwD project having real-life value for the institute student community, and instructors teaching methodology. When asked about their motivation for taking the course, students responded:

S17: The motivation for taking this course was to contribute to the project as the project outcome had huge implications on someone's academic life.

S11: The reason for having good interest was the project and the stake of the project because it was very much interested in how it's going to be implemented.

Immersing: For the question: "I enjoy the activities of the class, being unaware of the passage of time", student responses were seen distributed as strongly agree-7, agree-4, neutral-4, disagree-0 and, strongly disagree-0. Similarly, for the question, "I find the class activities rewarding in terms of experience", student responses were distributed as strongly agree-10, agree-5, neutral-0, disagree-0, and strongly disagree-0. Additionally, here are some responses to the open-ended question such as "I look forward to attending every ISD class because ____". Responses indicate students' immersion in the course:

S4: "In every class, the engagement is different. We will not just sit and look at the slides prepared by the instructor."

S5: "I will get to learn more about designing various training materials for PwD cell which is aligning with my interest to join this course".

Extending: For the question: "I find the PwD project an interesting extension as an application of the learning that is happening in the course", student responses were seen distributed as strongly agree-11, agree-3, neutral-1, disagree-0, and strongly disagree-0. An example of students extending their understanding is given below:

S13: "PwD project has a non-academic context. We can relate the theories which we are learning, being applied to this project as well. This broadening of the horizon of application of what we are learning beyond the typical academics-related projects gives us a new perspective."

S11: I had learned during that time that we are not helping them (PwD), it's not like giving them something that they can't do, they are able to do it themselves, we are just giving maybe some sort of scaffold. So this change in perspective and mindset also occurred because of that interaction with the students.

6. Discussion and Conclusion

In this study, we investigated how instructor strategies have helped in sustaining students' interest in the semester-long ISD course. We have identified the course-level strategies implemented by the instructor and mapped the indicators of triggering, immersing, and extending the interest with the help of the strategies. The findings of this study are in line with Wong et al (2020) and suggest that the thoughtful implementation of IDC theory in the semester-long course can trigger students' interest in the project activities, immerse them by attaining a state of flow and make them extend their learning in a meaningful way. The findings regarding real-world projects are in line with Rohm et al (2021) and show that the real-world context of the PwD website project has played a bigger role in sustaining the interest. Evidence has shown that having a diverse group composition with students from different levels of expertise gives an opportunity for better collaboration and teamwork. participants expressed that the social value of the PwD website project and its potential impact has helped them to maintain an interest and moral responsibility at a high level.

Each team has put in hours of work while brainstorming ideas, curating and creating training resources, presenting work in front of the whole class, and adopting the changes and feedback given by different stakeholders. Feedback at different time points from the stakeholders, end-users, and experts gave an authentic test bed for the product (PwD website) developed by the students. Working on a relevant problem, acquiring required

skills, managing the task deadlines, and delivering desired product deliverables has provided the ISD students with experience in managing a real-world instructional design project. For students, this experience has been valuable from multiple perspectives, including the learning of ISD concepts, expanding the horizons of understanding the challenges of PwD, and their role as individuals contributing towards a shared goal i.e. PwD website.

For an instructor, understanding students' interest and aligning it with course projects is an important task. Though it requires intensive efforts, It has helped instructor design effective learning strategies and sustain the students' interest throughout the course. Sustained students' interest seems to be a key to sculpting interest-driven creators.

Acknowledgment

We would like to thank the anonymous reviewers, and our study participants for their valuable participation and colleagues for their support throughout the ISD course.

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