

# Designing the Future: Investigating Budding Instructional Systems Designers' Sense of Agency and Learning in a Multi-cohort Complex Community

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**Abstract**— The field of Instructional Systems Design (ISD) draws from many theoretical models that are organically connected with the learning outcomes. However, in a regular ISD course, students are not given substantial practical exposure to apply theoretical insights. Hence, here we report on an atypical ISD course that targeted a real-life complex task of designing a website for the sensitization of teachers and peers towards disabled students. The participants of the course became the default IS designers, while the Persons with Disability (PwD) Cell of the Institute was the client. The class had people with different levels of expertise and, consequently, was divided into three cohorts- 'X'- had crediting students, 'Y'- had 2nd and 3rd year Ph.D. (auditing) students, and 'Z'- had students nearing graduation/post-doctoral fellows (sitting through). These cohorts were further divided into four groups with members from different cohorts, and tasked with the design of modules on ADHD, Autism, Locomotor, or Visual disability. Motivated by earlier research with the multicohort community, we were interested in investigating younger members' (cohort 'X') sense of agency and learning. We used a 'social practice theory' lens to conduct clinical interviews with all the 'X' cohort students and a few 'Y' cohort students (n= 10 + 4= 14). The qualitative data was analyzed using grounded theory methodology which suggests that the 'X' cohort students were able to exercise their agency while creating a troubleshooting space for their learning to flourish. The course's design and conduct have implications for both ISD practitioners and researchers.

**Keywords**— *Sense of agency, complex community, instructional systems design, grounded theory, problem-solving, training modules*

## I. INTRODUCTION

At the heart of any pedagogical reform lies the development of well-designed training modules or instructional resources that can be effectively and efficiently conveyed to the target audience. For instance, all curriculum reforms are hinged on large-scale teacher training programs, for say, the inclusion of ICT in education [1], upkeep of mental health [2], professional development [3], etc. Given the range of its impact, the design

of the training modules is, therefore, a critical aspect that needs a systematic engagement with the needs of the target audience. Thus, the field of Instructional Systems Design (ISD), drawing heavily from different models and theories, utilizes a 'systems' approach, the practical origins of which can be traced back to the deployment of Systems Approach to Training (SAT) models by the US military [4].

Within the dynamics of the changing world, catering to the needs of diverse groups of people, embedded in complex environments, the role of IS designers is both far-ranging and challenging [5]. Multiple studies have been conducted to understand the challenges, constraints, and contextual issues that IS designers face at their workplaces [6]. A major challenge identified in the process concerns taking cognizance of the client's needs and mapping them onto the multiple small decisions that the IS designer must make [7]. A prime reason behind this challenge could be tracked down to the way the ISD courses are taught. For instance, [8] argue that the models used in the ISD courses do not draw from the field's practice and that the ISD practitioners' implicit knowledge needs to be translated back and integrated into the teaching courses.

This gap between the theory and the practice of the ISD field could be bridged by exposing budding IS designers to a real-life IS designer's task during the running of the ISD course. This would mean that students are exposed to the process of need analysis, have first-hand experience of undergoing the pressure of 'delivering' the product, and, of course, go through the rigor of content development, all in a limited time frame. A significant consequence of this process would be on students' concept of 'self', where they might experience a shift in their sense of agency as they get to perform a role that could bring about a change in the outside world, similar to the work of 'real' IS designers [9].

In a typical ISD class, the theories and models are learned individually, but in the field, it is mostly a team's effort that goes into the design process. Further, collaborative processes for design have been shown to be more successful than individual

processes [10], and working in collaboration is reported to be more effective for learning than working individually [11]. However, it is also reported that collaborative work makes more sense to ‘low individual achievers’ and to ‘high team achievers’ [12] and there’s always a risk that low achievers could become passive in the presence of high achievers [13].

Being ‘passive’ in a group problem-solving exercise would mean that students score low on exercising their sense of agency, i.e., they no longer feel responsible for the task [14], have a low sense of ownership, are not confident about their learning, and consequently make a low contribution to the intended outcome [19]. Since this study is contextualized in an ISD course that had the responsibility of letting primary learners gain first-hand knowledge about IS models and theories, and since these learners were embedded in a multi-cohort community of members with diverse experiences and expertise, we were curious to investigate the agentic experiences of the young learners.

Hence, we engaged with students’ sense of agency and learning as they set out to solve a real-life problem of designing a website for the sensitization of teachers and peers towards disabled students. The study involved groups of individuals placed at varying levels of expertise in the course which used a real-life design problem to expose students to both theoretical and applied aspects of the field. The design task was divided into modules which were assigned to four different groups of participants. These participants with varying expertise had different expectations from the course, some were crediting, some were auditing, and the rest were just sitting through (see Section 4 for details).

## II. SENSE OF AGENCY (SOA), COMMUNITY, AND LEARNING

The psychological perspective of agency refers to the association between a voluntary action and an outcome or the feeling of controlling external events via one’s actions [14]. In contrast, a sociocultural perspective of agency would refer to the socially mediated process that is constrained and enabled by the structures available to an agent [15]. In both these aspects, the belief in one’s efficacy or the belief to effect change is one of the key mechanisms for exercising agency [16]. In this study, we are using explicit measures to assess different aspects of this belief and we call them the ‘agentic experiences’ of participants. These experiences are about solving the design problem, and about participants’ learning during the design process while being embedded in a complex social community.

The study of learners’ agency is quite popular in the research literature [17]. However, within the specific domain of ISD, studies have reported on different forms of agency that are visible in the ISD practitioners and not ISD students. For instance, [9] have identified interpersonal, professional, institutional, and societal agency based upon practitioners’ sense of commitment and control of actions pertaining to self, profession, their places of work, and society at large. Further, the concept of agency has been known to be at the core of successful execution of projects and learning. However, with no studies done with ISD students, it is hard to construct a theoretical trajectory of how this sense of exercising agency develops and further, how it might contribute to their learning and problem-solving. Hence, in this study, we are focusing on

investigating different aspects of ‘interpersonal’ agency which is known to impact learning [9].

In the practice of ISD, a team of designers forms a community of practitioners who collaborate with each other on multiple steps of the design task and use each other’s experiences as a learning resource to make sense of the problem at hand and troubleshoot the problems they face [18]. In the context of the present study, the participants placed at different levels of expertise in groups would form this ‘community’, and we will be looking at the interaction between the members within the groups and how their interaction influences the sense of agency of the junior members in the group.

To map participants’ agentic experiences, we report on their sense of control, which can be defined as the feeling of initiating and being responsible for an action [14], sense of ‘ownership’ which is the feeling of ‘mineness’ or the feeling that something ‘belongs to self’ [19], sense of ‘confidence’ which is the belief of being able to achieve intended outcomes [16], and the sense of ‘contribution’ which concerns the judgment of one’s share of work in the completed task [19]. To map participants’ learning, we use grounded theory to identify themes in their self-report on different aspects of interaction with the community members, like focusing on the effect of being placed in a group with different academic levels of expertise, and the way they handle conflicts and disagreements and how it impacts their reaching of the intended goal. Since the IS literature reports the need to integrate implicit learnings from the practice into the course [8], we also focus on identifying aspects of participants’ interaction that might mirror the implicit learnings made during any IS practice and, thus, our work also seeks to inform the IS community about such practices.

## III. THEORETICAL FRAMEWORK

We use the theoretical framework of ‘Social Practice Theory’ [20] to capture the processes of junior participants’ interaction within the multi-cohort group community, and, further, assess the impact of this interaction on their agentic experiences and learning. Social Practice Theory (SPT) has a central focus on participants’ actions/interactions, which are made explicit in the form of gestures, speech, etc. The emphasis on differences among the participants is made explicit via the struggles and conflicts that appear during the interaction, and through the shaping of participants’ actions around these differences. Using the SPT lens, we seek to understand how the junior members’ agentic experiences are shaped by their interactions within the group community and how they are set on the path of becoming ‘practice-ready’.

Situated within the interactive process, we also use the lens of ‘contested’ spaces [21]. Contested spaces are formed during the moments of interaction when participants question and challenge each other’s ideas and processes in a community. The construction of a ‘contested’ space is a dynamic process that is mediated by the agentic moves of the participants, which in turn, shapes their sense of agency. We use this lens to uncover points of conflict and discussions with the group community that might have shaped participants’ agentic experiences.

#### IV. STUDY CONTEXT

The present study draws from the running of an ISD course, which was offered by the Educational Technology program of the Institute during the spring semester of January-April, 2023. The course followed constructivist values by aiming to promote students' autonomy, providing relevant learning context, embedding reasons for learning in the problem-task, supporting learners' self-regulation by giving measured responsibility, and strengthening the learning process by enabling feedback on the designed product [22]. In the beginning, the instructor shared the goal of the course with the students as-

*"To create awareness among the functionaries of higher education about the specific educational needs of differently-abled persons".*

This larger goal was translated into an ISD task which involved designing a website, composed of different training modules, for the sensitization of teachers and peers towards disabled students. The training modules involved focus on four different forms of disability- Autism, Locomotor disability, ADHD (Attention-Deficit/Hyperactivity Disorder), and Visual disability. The students of the course were the default IS designers and the Persons with Disability (PwD) Cell of the Institute was the client.

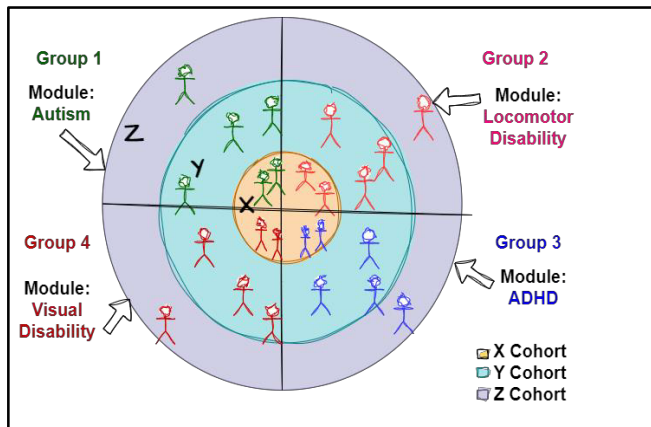


Figure 1. Illustrative visualization of the ISD class structure. Adapted from instructor's notes.

In addition to using a real-life ISD task for teaching disciplinary models and theories, this course was also atypical in its structural composition (see Figure 1). It was conducted in a hybrid mode and was open to all in the department who were interested in participating in the task. As a result, around 25 people, placed at different levels of expertise, participated in the class. To focus on the primary recipients of the course who were the Masters and the first-year Ph.D. students crediting the course, and to efficiently manage the conduct of the course, the instructor divided the class into three cohorts- X, Y, & Z. The 'X' cohort comprised of the primary recipients- students crediting the course, 'Y' comprised of the 2nd and 3rd year Ph.D. students, and 'Z' comprised of students nearing graduation and post-doctoral fellows. Further, the three cohorts were divided into four groups such that each group had members from all three cohorts. Overall, there were 5-6 members in each group, and the four groups were responsible for the development

of the modules on Autism, Locomotor disability, ADHD, and Visual disability, respectively (Figure 1).

Situated in such a complex community of participants, there was a high risk of the 'X' cohort students, the youngest on the experiential scale and the budding IS designers in this study, to be overwhelmed by the presence of 'Y' and 'Z' cohorts in their groups. Also, with more experienced others in a group, it is not unnatural to let the sense of responsibility for the completion of a task at hand get diluted. Hence, being cognizant of the diversity in the attendees of the course and maximizing the learning opportunities for the crediting students, the instructor of the course pre-defined the roles of all cohorts at the beginning of the course by elucidating the learning objectives for all the cohorts (Table 1).

TABLE I. INSTRUCTOR'S OBJECTIVES FOR THE DIFFERENT COHORTS

Cohort	Learning Objectives (LOs)
X	Same as the objectives specified for the course. They should be able to apply ID models, create content, design small-scale instruction units, etc.
Y	Learn to plan larger-scale ISD training programs Gain mentoring skills- what prompts and scaffolds to provide to Cohort X for them to attain their (LOs) Gain teaching skills- by observation and practice (conducting workshops)
Z	Planning of courses- Making connections across topics Reflecting on the instructor's actions for their own teaching Improving mentoring skills by providing support to X and Y when required.

The learning objectives shown in Table I helped all the participants of the course to establish their commitments and manage their expectations from the course before getting to the real-life ISD task of designing training modules. However, since the task was to be performed in groups comprising members with diverse expertise and experience, there was a concern about the exercise of the sense of agency of cohort 'X'. This concern is based on earlier research findings which have suggested that younger members' sense of agency is reduced in a group with more experienced members [23].

Hence, in this study, we were curious to look at how 'X' cohort students exercised their sense of agency as they worked together with more experienced others while working on the module design task to be delivered within a limited time frame.

Specifically, our research questions were-

- RQ1- What was the 'X' cohort students' perception of their sense of agency as they performed the ISD module design task while being embedded in a complex multi-cohort community involving peers and seniors with differing levels of expertise?
- RQ2- What are the salient features of 'X' cohort students' interaction with the other cohorts?
- RQ3- How did the interaction with the other cohort members influence the learning of 'X' cohort students?

## V. METHODS

## A. Research Design

We use a grounded theory methodology which is appropriate when the purpose of a study is to construct an explanation grounded in the data to illuminate the processes involved in the focus of inquiry [24]. The focus of inquiry in the present study is measuring the agentic experiences of the 'X' cohort while being embedded in a multi-cohort community. To draw meaningful interpretations of the findings, we use the principles of grounded theory (GT) by systematically studying the processes in the time period pertaining to the exercise of different measures of agency by the 'X' cohort students [25].

In the design framework for using GT, the method and processes are intertwined and the analysis involves a non-linear pathway where the processes are 'recursive' and 'iterative' [26]. In the context of this study, we systematically analyze the process of Cohort X's interaction with other cohorts to reveal the quality of empirical relationships that emerged during their interaction and which contributed to the quality of exercise of different aspects of agency [27].

## B. Participants

A total of 14 participants (8F, 6 M; Mean age = 30.33 years, SD = 4.27) were interviewed for the present study of which 4 (all females) belonged to the 'Y' cohort and 10 (6 males, 4 females) belonged to the 'X' cohort. All students were pursuing their Masters or Doctoral degrees. All the 'X' cohort participants were crediting the ISD course, while most of the 'Y' and 'Z' cohort participants were either auditing the course or were just sitting through the course. The motivation for being a participant in the course varied across the cohorts and within the groups.

## C. Data Sources and Analysis

Semi-structured clinical interviews were conducted with all 14 participants individually, and each interview lasted for around an hour. The interview questions were divided into three sections, focusing on identity, sense of agency, and the community of co-designers-cum-learners. The interviews were conducted after the students presented and handed over the designed modules to the instructor. For the present study, we have used data from only the last two sections of the interview. The video and audio recordings of the clinical interview form the primary data sources for the present research study.

The interview videos were first run through the 'Otter' application to generate transcripts which were then cross-checked for language, grammar, and authenticity by the authors. The corrected transcripts were then coded to identify emergent categories by the researchers. The process involved constant back and forth among datasets to discover patterns in students' responses. We used the 'constant comparison method' of GT which involves continuously analyzing and examining the data collected to explain the emergent themes of interactions that had an impact on the 'X' cohort's learning process [28].

## A. Students demonstrated higher scores on different measures of agentic experiences.

Under the section of agency for the clinical interview, students were asked direct questions about their sense of 'contribution' to the overall group task of module design, their sense of 'ownership' concerning the designed product - the webpage, their sense of 'control' during the design task and their 'confidence' to take on another similar design project. Students used a Likert scale rating to report on these measures. Figure 2 depicts bar plots of the average scores of students' responses to these measures of agentic experiences.

## 1) Sense of Contribution

Students were asked to rate their sense of individual contribution to the building of the PwD website. They were asked to rate their contributions on a Likert scale from 1-5, where 1 referred to 'zero' contribution, 2 referred to 'not much' contribution, 3 referred to 'neutral' or 'not much, not less' contribution, 4 referred to 'quite substantial' contribution, and 5 referred to 'extremely substantial' contribution to the building of the PwD website. The mean score of students' perception of their contribution to the task was 4.107 (SD = 0.79), suggesting a higher sense of contribution to the task (first bar from left in Figure 2).

## 2) Sense of Ownership

Students were asked if they had a sense of 'ownership', i.e., if they had the feeling that it was their own work when they looked at the built website. They were asked to rate their sense of ownership on a Likert scale with ratings from 1-5, where 1 referred to 'certainly not my work', 2 referred to 'not my work', 3 referred to 'neutral' or 'unsure about my ownership', 4 referred to 'partly my work', and 5 referred to 'completely my work'. The mean score of students' perception of their ownership concerning the built PwD website was 3.96 (SD = 1.008), suggesting a slightly lower sense of ownership than their sense of contribution to the task (second bar from left in Figure 2).

## 3) Level of Confidence

Students were asked about their level of confidence concerning their fluency in the execution of another similar task of designing a training module for a relevant stakeholder in the near future. They were asked to rate their level of confidence on a Likert scale from 1-5, where 1 referred to a 'very low' level, 2 referred to a 'low' level, 3 referred to a 'moderate' or 'not low, not high' level, 4 referred to a 'high' level, and 5 referred to a 'very high' level of confidence in executing a similar task on designing a training module. The mean score of students' perception of their level of confidence was 4.143 (SD = 0.663), suggesting a relatively higher perception of confidence than on the agentic experiences of contribution and ownership.

## 4) Sense of Control

Students were asked about their sense of 'control', or the feeling that they were driving the project in their group. They were asked to rate their sense of control on a Likert scale from 1-5, where 1 referred to 'no control', 2 referred to 'limited control', 3 referred to 'neutral' or 'unsure about the level of control', 4 referred to 'some degree' of control, and 5 referred to

‘full control’ concerning the driving of project in their group. The mean score of students’ perception of their sense of control was 3.58 (SD = 0.736), which reflects the lowest measure of agentic experiences with respect to the level of confidence, sense of contribution, and sense of ownership in that order.

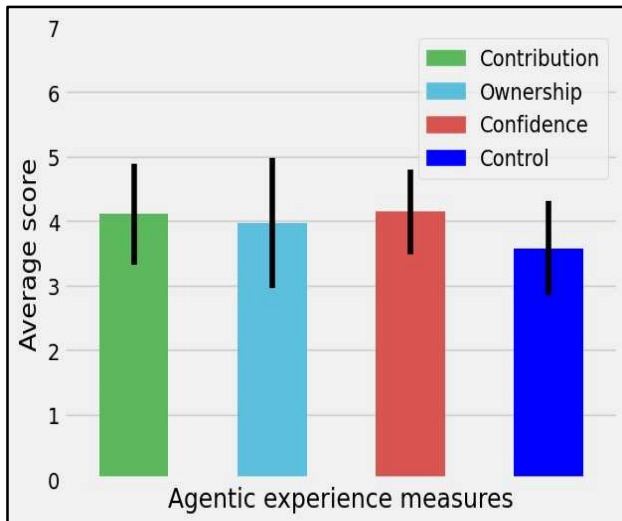


Figure 2. Students (n=14) perception of their agentic experiences. The X-axis depicts different measures of agentic experiences, while the Y-axis plots the average score of students’ 5-scale Likert ratings (Maximum score = 5) about their perception of ‘contribution’, ‘ownership’, ‘confidence’, and ‘control’ concerning the task of designing the PwD website. The error bars represent the standard deviation.

As visibly evident from Figure 2, a one-way ANOVA comparing the means of the four measures of agentic experiences was not significant ( $F= 1.415, p = 0.249$ ), suggesting that students’ experience with different measures of the agency was more or less similar and that, the multi-cohort learning environment did not impede their sense of agency, rather students experienced a strong sense of agency as they navigated the problem-solving process.

We also compared the self-reports of students from both ‘X’ and ‘Y’ cohorts on the measures of agentic experiences. Table II compares the mean and standard deviation of students’ responses to different agentic measures. Our Likert scale interpretation considered a score ranging from 1-1.80 as being ‘very low’, 1.81-2.60 as ‘low’, 2.61-3.40 as ‘neutral’, 3.41-4.20 as ‘high’, and 4.21-5.00 as ‘very high’ measure of experience. From Table II, we find that all mean scores correspond to a ‘high’ sense of agentic experiences, except for the measures of ‘contribution’ and ‘ownership’ for ‘Y’ cohort students, which are reported as ‘very high’ (mean scores above 4.20). Further, the table also reveals a high degree of variation in responses of students from the ‘X’ cohort in contrast to the ‘Y’ cohort (SD higher than 0.80) for all measures except on ‘confidence’ where we see a reverse trend, i.e., the ‘Y’ cohort has a higher variation than the ‘X’ cohort.

TABLE II. COMPARISON OF COHORTS ‘X’ AND ‘Y’ SELF-REPORTED LIKERT SCORES ON DIFFERENT AGENTIC EXPERIENCES.

Agentic Experience Measures	Cohort X (n=10)		Cohort Y (n=4)	
	M	SD	M	SD
Contribution	3.95	0.83	4.5	0.58
Ownership	3.85	1.16	4.25	0.5
Confidence	4.2	0.63	4	0.82
Control	3.58	0.85	3.59	0.43

Thus, our findings from this section answer our RQ1 and suggest that students from both the ‘X’ and ‘Y’ cohorts had a high sense of exercising agency as they performed the ISD module design task while being embedded in a complex community involving peers and different cohorts. This is also evident from students’ explicit responses from the clinical interview. For instance, Student 8 (‘X’ cohort) shared- “I was able to express myself at all times” (sic).

#### B. Students’ responses suggest instances of both conflicts and support during interactions with other cohorts.

The transcripts of the semi-structured clinical interviews were coded to identify different themes of interaction that emerged within groups during the problem-solving task. The qualitative analysis revealed that the ‘X’ cohort students’ experiences with the other cohorts could broadly be categorized under ‘conflicts and disagreements’ and ‘agreement and support’. Below we describe these broad categories of interactions through various instances and give evidence from students’ (n=10) responses.

##### 1) Conflicts and Disagreements

- Time: ‘Time’ was one of the major factors that led to disagreements or conflicts. Finding common slots for meeting outside the timings of the scheduled class to make progress on the project was hard. For instance, an ‘X’ cohort student revealed that her peers had almost little to no interaction with the ‘Y’ cohort members in her group. She said-

“But for them, I thought it was more of (an) optional thing..less outside the class as the timings were not matching for doing the task.” (sic).

Here, the student also alludes to the less work pressure on the ‘Y’ cohort students as they were not crediting the course.

- Delayed Feedback: The timing of the feedback provided by the other cohorts was also crucial. So, for instance, an ‘X’ cohort student shared that it was ‘frustrating’ to receive delayed feedback from seniors. She elaborated-

*“We developed the whole thing and then the feedback is coming. So that is very demotivating for us because we dropped two videos like that which we created... but at the end it was like no, it is not going with the context or the script is not that great. So that was demotivating”* (sic).

An interesting aspect to note here is that even though the ‘X’ cohort students found the delayed feedback to be frustrating, they agreed and followed the suggestion, notwithstanding the loss of their effort.

- Selection of content: The selection of concepts and ideas that eventually become part of the project outcome is both a consequential and contentious aspect of group interaction. This was visible in the ‘X’ cohorts’ group interaction as well. For instance, a student explained-

*“we sure did have a lot of discussions..primarily related to the language.. because we had to be sure...about what that language communicates...So those kinds of discussions... So that was the result of that don't dismiss everything. So I wouldn't say conflict, but the battle of ideas”* (sic).

## 2) Agreement and Support

In addition to the above instances of disagreements and conflicts, ‘X’ cohort students also reported agreement and support from the other cohort members. Below we discuss a few of these categories of interaction.

- Accountability: One of the many ways in which senior-junior interactions pan out, in reality, involves juniors being accountable for their actions to their seniors. Although there was no said rule to this effect, we found many ‘X’ cohort students admitting to being ‘answerable’ or ‘accountable’ to the senior cohorts. And, this role was shared in a positive light. Thus, one student shared-

*“There should be someone who can remind us time to time okay, this is what we have done and this is what we have done. So that control.sort of accountability was present.”* (sic).

Dictated by the social norms of interaction, this sense of accountability was used as a tool to make progress on the project by the younger cohorts.

- Discovery of qualities: In a group problem-solving task, we may not always be assigned tasks that match our strengths, rather these decisions might be taken based on the demand of the time and the pressure of the deliverable. The dynamicity of group interactions at times leads us to recognize and acknowledge hidden abilities and talents both within ourselves and in other team members. This discovery of quality facilitates the learning process by adding to our experiential repertoire. A few ‘X’ cohort students also admitted to discovering new abilities during their group interactions. For instance, Student 1 shared-

*“He made me do things that I generally otherwise don't do. He's a good leader”* (sic).

- Camaraderie: Increased frequency of interactions during a group task helps us to familiarize ourselves and connect with other team members. This step is crucial first in developing a sense of camaraderie and bonding within a community. We found that our real-world ISD task led senior cohorts to engage and connect with the younger cohorts. For instance, a senior student shared-

*“This course also helped me in getting to know first years closely”* (sic).

Thus, our findings from this section answer our RQ2 where we found that the salient features of ‘X’ cohort students’ interaction with other cohorts involved instances of both conflicts-disagreements and agreements-support.

## C. Influence on learning due to the interaction with other cohorts

The interactions with other cohorts during the ISD problem-solving task contributed to both conceptual and social learning for younger cohorts. Their learning resulted from and was grounded in both conflicts and agreements that they experienced during their interaction with the other cohorts. Below we discuss such instances of learning.

- Learning from conflicts and disagreements.
  - a) Managing expectations: Due to the mismatch of ‘time’ slots availability, the younger cohorts taught themselves to step up their work and since they were crediting the course, they felt more responsible. For instance, an ‘X’ cohort student shared-
 

*“So, things didn't match with them (seniors in the group) and we didn't expect much from them”* (sic).
  - b) Rules for interaction were designed: Having faced the ‘frustration’ arising due to the delayed timing of the feedback where the ‘X’ cohort had to discard their earlier work, they took charge and designed a new rule for interaction to solve the ‘delayed feedback’ problem. An ‘X’ cohort student shared how her group came up with a rule to handle the conflict –
 

*“Sometimes like your ‘Y’ cohort is saying this and ‘Z’ cohort is saying that. So for that..we come to..one ground - whenever meeting will happen all cohort will be there. So that anything will not be missed.”* (sic).

With the new rule in place, everyone from the group had to be present for the group meeting, thus saving and optimizing everyone’s efforts.

- c) Discussions: With conflicts concerning the selection of content, the groups worked around by actively engaging in discussions about different suggestions and evaluating the suggested concepts based on the requirements of the deliverable, as emphasized by the client. Thus, a student shared-

*“So since people...bringing their different perspectives...also have a different way of perceiving...we have like a back and forth going on with each idea whether we have to put it...whether it is conveying the appropriate message or not.” (sic).*

- Learning from agreements and support.

a) All ears! Open to corrections: Being ‘accountable’ to the seniors meant that the younger cohorts were quite attentive to the suggestions that came from seniors. For instance, Student 4 shared-

*“I would say when we (‘X’ cohort) were coming up with ideas, we may have some sort of biasness (biases) with that so they (other cohorts) were the ones who were actually helping us to come out of that biasness and look at it from a different perspective. So their feedback was very helpful.” (sic).*

An interesting thing to note here is the ‘openness to learn’ with which the younger cohort approached the suggestions from the seniors.

b) Learning about new concepts and ideas: Just as individual qualities were discovered during the process of interaction, similarly students were exposed to new ideas and concepts. These concepts/ideas added to the experiential repertoire of the students and, likely, facilitated learning. For instance, Student 11 shared-

*“I think, intellectual ideas... during discussions, the point of view that seniors bring in...helped us drive the conversation..I think the GIF idea (example of an idea that came from a ‘Y’ cohort member)..a few unique ideas for sensitization I received from the seniors” (sic).*

c) Sense of teamwork: Building on the camaraderie that was developed during the process of interaction in the problem-solving task, students developed a sense of ‘team’ which is known to play a role in developing identities and strengthening the sense of belonging within communities. For instance, Student 3 shared-

*“When I see the website, the faces of my all peers, you know, that is also there. So my individual work, maybe maybe that is there, but when I see the website, whole team comes” (sic).*

Thus, our findings from this section answer our RQ3 where we found that the ‘X’ cohort students’ interaction with the other cohorts had an impact on their learning which was both social, like making new rules to mitigate conflicts, and conceptual, like learning of new concepts/ideas (viz., using GIF) to develop content for the design of a training module.

## VII. DISCUSSION AND IMPLICATIONS

In summary, in response to RQ1, we found that even in the presence of senior members, the ‘X’ cohort students could retain their agentic experience or exercise interpersonal agency [9]. With our findings corresponding to RQs 2 & 3, our use of grounded theory methodology helped us reveal the finer aspects of the ‘X’ cohort students’ interaction with other experienced

members of the group and their learning which might have played a role in their exercise of agency.

The Likert scale measures provide insights about ‘X’ cohorts’ perception of different measures of agency. The comparison of the ‘X’ and ‘Y’ cohorts also suggests that the ‘X’ cohort’s response was almost at par with those of the limited datasets of the higher cohort. However, the two cohorts differed in the degree of variations that were visible overall, i.e., the larger standard deviations in the ‘X’ cohort suggest that a strong sense of agency is not uniformly distributed across the ‘X’ cohort. Still, their lower variations on the level of confidence to execute a similar project and higher mean score suggest that the ISD course was able to meet the larger learning objective that the instructor had shared at the beginning of the course (Table I), which was about applying IS models, designing and creating content for relevant stakeholders.

The theoretical lens of ‘social practice theory’ [20] and ‘contested spaces’ [21] led us to use the constant comparison method of grounded theory to develop thick insights about the process of the ‘X’ cohort’s interaction with the other cohorts. Our findings suggest that the budding IS designers’ interaction with the senior cohorts was marked with multiple instances of both conflicts and support and that these interactions were connected with their learning at both social and conceptual levels. The recursive and iterative nature of our method led us to draw interrelationships between learners’ interactions and learning outcomes.

Our work makes a contribution to the literature on the theoretical development of budding IS designers’ or IS students’ sense of agency. Further, it creates a basis for comparing the SoA of IS students with the SoA of IS practitioners e.g., [9]. Given the significant role of agency in learning outcomes, our work confirms that the presence of multi-cohort learning environments does not necessarily impede budding learners’ SoA. We believe that the role of the instructor was equally crucial in the process as the explicit sharing of the expected roles and learning objectives for different cohorts might have provided an implicit scaffold for directing the actions of all cohort members in the group task. The deliberate and conscious action must have helped manage participants’ expectations and establish their commitments and, hence, when the instructor moved away during the group task, the higher cohorts stepped into their expected roles of being ‘mentor’ (see Table I), while the budding designers actively wore the learner’s hat.

The development of the sense of teamwork is a major differentiating factor between students’ tasks and practitioners’ tasks and our findings suggest that by the end of the ISD course and with the delivery of training modules to the relevant stakeholders, our budding designers were already visualizing the team to be present in the project deliverable. And, thus, we could say that the budding IS designers are ‘practice-ready’.

Our work has implications for the design and conduct of the ISD courses. With real-life IS tasks, with a diverse group of participants, and with clearly laid learning objectives, we show that IS students’ sense of agency could flourish and that they could still develop the confidence to lead similar IS projects by the end of the course.

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