**Active Learning, Student Engagement, and Confronting Teaching and Learning Perceptions: How Learning Environments in a Teacher Education College Elicit Opportunities and Challenges**

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**Abstract**

This article describes a study conducted at a teacher training college in Israel as part of the effort to integrate active learning methods through the use of learning spaces - innovative learning environments that combine constructivist learning approaches and up-to-date learning technologies. The research used a mixed methodology to explore the opportunities, challenges, and barriers faced by those using these learning spaces. The study involved 60 students and ten lecturers.

The findings indicate that while active learning enhanced students’ emotional involvement and agency, their opinions were mixed regarding the benefits of this learning approach. On the other hand, the faculty’s experience in learning spaces confronted them with their teaching approaches and uncovered their fundamental beliefs about teaching and learning.

This is the first study conducted in Israel on learning spaces in a teacher training college. It concludes with recommendations on how to address barriers and challenges inherent in this important issue, given the potential of these learning environments to impact teachers’ perceptions and future teaching practices.

Keywords: learning spaces, active learning, student engagement, teaching approaches and methods, higher education.

1. **Introduction**

The prevailing practice in most higher education institutions is lecture-based teaching, where the lecturer imparts knowledge to students who passively receive it and are expected to store it in their memory [1]. However, numerous studies argue that this passive approach is ineffective. In contrast, teaching methods that promote active learning can foster deeper engagement and critical thinking far more effectively than traditional approaches [2-3], as they encourage students to assume responsibility for their learning process [4]. Moreover, research indicates that active learning also enhances students’ mental well-being [5].

It is crucial for institutions of higher education, especially teacher training colleges, to adopt teaching approaches that promote active learning, which offers numerous advantages. Providing future teachers with diverse experiences as active learners is essential not only for enhancing their own learning but also for shaping constructive teaching and learning perspectives that will influence their future teaching practices. Therefore, teacher training colleges should pioneer the transition from traditional teaching methods to innovative and constructive approaches.

This mixed-method study, conducted at a teacher training college in Israel, explores the opportunities and challenges of advanced learning environments designed for active learning and examines perspectives from both teaching staff and students who engage in these spaces. Lecturers were required to adapt their teaching styles, while students had to adjust their learning approaches to suit the advanced environment. The research draws on data from 60 undergraduate students who took at least one course in an active learning space at the educational college, along with interviews with ten lecturers who taught in these environments. The findings reveal a complex picture from the viewpoints of both lecturers and students concerning their experiences in the learning spaces. Many lecturers lacked sufficient knowledge and teaching skills for such environments, which prompted them to reflect and reassess their teaching practices and beliefs about teaching and learning. Additionally, the study indicates that students’ engagement in learning increased in terms of emotional involvement and agency, although they expressed mixed feelings about their experiences. The study delves into the reasons behind these complexities and offers recommendations for addressing the challenges and barriers that were identified.

The uniqueness of this research lies in exploring perspectives that have not been sufficiently investigated regarding teaching and learning in learning spaces at a teacher training institution. It sheds light on the perceptions of lecturers and students concerning engagement in learning and active teaching methods, which are crucial for future teachers to experience.

1. **Literature Review**

Since the 1990s, with the development of learning theory, neuroscience, and educational technologies, researchers have gained new insights into the nature of learning and teaching processes, which have themselves undergone profound changes [6]. Researchers have also recognized the critical role of the learning environment in fostering learning, leading to increased focus on learning spaces among the scientific community and educators [7]. Many countries have researched innovative learning environments [8], technology-enhanced learning environments [9], and the new generation of learning spaces [10]. Although these new learning spaces are still evolving, they operate based on the same theoretical principles of “learner-centered” approaches, encouraging collaboration and inquiry-based learning [11]. Furthermore, these spaces integrate pedagogical principles that shape the environment, emphasizing learner engagement and active learning [12], and are equipped with flexible furniture, diverse tools, and technological resources [13] designed to enhance learners’ achievements [14]. These new learning spaces are defined as active learning environments [15].

While traditional classroom structures have previously been influenced by behaviorist theories [16], where instructional systems and technology primarily serve the lecturing teacher [17], the new learning spaces integrate constructivist learning approaches with contemporary learning technologies, and emphasize the need for collaboration among students to facilitate the active construction of knowledge [18]. Previous studies have demonstrated that learning spaces have a significant advantage in terms of improving students’ performance compared to traditional classrooms [9, 17, 19-20]. Nevertheless, traditional classrooms remain the predominant setting in many educational institutions, including universities and colleges [21-22], as lectures continue to be the primary teaching method in most undergraduate courses.

In recent years, higher education institutions have shown increasing interest in learning spaces, particularly in relation to student engagement, yet this topic remains underexplored [23]. While students may not necessarily mention physical learning environments when talking about their learning experience, the significance of this aspect becomes evident when students note positive changes in their lecturers’ teaching methods. In this context, research indicates that lecturers require substantial support when adapting their teaching methods to accommodate various types of learning spaces [23-24].

The term “student engagement” has been linked to active learning [e.g. 25] and has garnered increasing attention from researchers, practitioners, and policymakers over the past decade. The concept refers to the energy and effort students invest in their learning community, which is shaped by various factors such as interpersonal relationships, learning activities, and the learning environment. The more engaged and empowered learners are within their community, the greater the likelihood they will harness this energy for learning, leading to a variety of outcomes that can encourage further engagement [26].

Foundational works such as Astin’s [27] involvement theory and the conceptual framework offered by Fredricks et al. [28], which address the three dimensions of student engagement (behavioral, emotional, and cognitive), have significantly enhanced our understanding of this complex phenomenon, which researchers describe as a multifaceted and intricate construct [29-30], sometimes referred to as a “meta-construct” [e.g., 28, 31].

Another dimension researchers attribute to student engagement is agentic engagement, which refers to instances where students proactively contribute to their own learning and the instruction they receive in the classroom [32]. Through this form of engagement, students find ways to enhance and tailor the teaching methods to suit their needs and preferences. This type of student engagement is closely linked to the students’ motivational factors. Furthermore, research indicates that agentic engagement positively correlates with autonomous motivation, and that both are associated with proactive behaviors [33].

Alongside the growing focus on student engagement, digital technology has become integral in higher education. Naturally, this affects many aspects of the learning experience [34-35], including student engagement, as digital technology facilitates more dynamic and immersive teaching and learning experiences [36-37].

However, the use of technology does not guarantee that students will be engaged and active learners [38]. While technology can enhance excellent teaching, it cannot replace poor teaching [8]. Therefore, it is crucial to better understand how integrating technology in learning and learning spaces contributes to students’ engagement and academic achievements.

Active learning is commonly defined as engaging students in meaningful discussions, listening, reading, and writing exercises, as well as reflective dialogue about their learning [39]. Adopting this definition can help us understand the challenges faced by higher education institutions, faculty, and students. It also highlights the valuable role of learning spaces that support active learning and their potential to enhance teaching and learning in higher education.

* 1. **Research Objectives**
1. To examine how lecturers and students experience teaching and learning processes in learning spaces and how these spaces contribute to learning and teaching processes.
2. To identify the barriers and challenges preventing lecturers and students from making optimal use of learning spaces.
	1. **Research Questions**
3. How do students perceive their experiences in the learning spaces**?**
4. How do learning spaces contribute to student engagement in active learning**?**
5. How do lecturers perceive their teaching in learning spaces, and how does this perception affect their teaching practices**?**
6. What are the challenges and barriers students and lecturers face in promoting active learning in learning spaces?
7. **Research Background**

The first learning space in Israel was established at a teaching college during the 2019-2020 academic year. Today, there are four learning spaces on two of that campuses of the college. Prior to the start of the previous academic year, a call for proposals was issued inviting faculty members to teach in these space. They were also offered guidance and training by the Teaching and Learning Division on suitable methodologies for utilizing these spaces.

Out of 100 lecturers, fourteen responded to the call and expressed interest in teaching in the learning spaces on one of the campuses. However, none of them requested guidance or training. Ultimately, around 30 lecturers were assigned to teach in these spaces, meaning that some lecturers who did not volunteer were assigned to teach in these classrooms, while others who requested to teach there were not assigned due to scheduling conflicts with other lecturers.

The lecturers assigned to teach in the learning spaces were invited to a Zoom meeting arranged by the college’s Teaching and Learning Division. A guest lecturer, specializing in teaching and learning processes in active learning spaces, was invited to present. Ten lecturers participated in the meeting, during which they learned about the rationale behind establishing the learning spaces, strategies to promote active learning, and methods to effectively utilize the space to achieve lesson objectives. Following the meeting, the lecturers were once again offered guidance; however, only one of them contacted the Teaching and Learning Department for further assistance.

The college has approximately 800 undergraduate students enrolled in 15 different programs across two campuses. While most students participating in the study took at least one course in a learning space, they may not necessarily have had a lecturer who requested to teach in such a classroom.

The students studying in these classrooms did not receive training or a specific explanation about learning spaces. However, explanations were posted on the walls and they could explore active learning topics further by scanning QR codes.

1. **Method**

In May, an email was sent to the 30 lecturers who had taught in the learning spaces during the academic year, inviting them to participate anonymously in a research study. The email explained that the study aimed to help the college draw conclusions and develop insights about the teaching and learning processes in these spaces, with the objective of enhancing student learning experiences and identifying the needs of lecturers who teach in these environments. Six female and four male lecturers responded to the email and agreed to be interviewed. A research assistant arranged either a phone interview or a Zoom meeting with each participant, based on their preference. Each interview lasted approximately 30 minutes, and all interviews were recorded and transcribed.

* 1. **Participants**
		1. **Lecturer Population**

The study included four male lecturers and six female lecturers who had been teaching at the college for at least two years. The lecturers taught in different departments and had diverse areas of expertise. Four lecturers had more than 11 years of tenure at the college, five had 6-10 years of tenure, and one lecturer had less than five years of tenure (see Table 1).

**Table 1. Lecturer characteristics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Gender** | **Tenure** | **Discipline** |
| Avi | Male | Over 11 years | Education |
| Tzvia | Female | 6-10 years | Exact sciences |
| Hava | Female | Up to 5 years | Education |
| Adi | Male | 6-10 years | Humanities |
| Tzvia | Female | Over 11 years | Humanities |
| Gil | Male  | 6-10 years | Humanities  |
| Tzipora | Female | Over 11 years | Education |
| Shir | Female | 6-10 years | Education  |
| Tamir | Male | 6-10 years | Education  |
| Gitit | Female | Over 11 years | Humanities  |

* + 1. **Student Population**

In May, an email was sent to 151 students who had attended at least one course in a learning space on one of the campuses that year. The email included a brief explanation of the study and a link to an anonymous online questionnaire. Sixty students (approximately 40%), comprising 39 women (65%) and 21 men (35%), agreed to participate in the study and complete the questionnaire. About half of the participants were in their first or second year of studies, and most respondents were over 22 years old, married, and had prior experience working in the education sector (see Table 2).

**Table 2. Distribution of demographic variables**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | n | % |
| **Year of studies** |  |  |  |
| First |  | 13 | 21.7 |
| Second |  | 13 | 21.7 |
| Third |  | 8 | 13.3 |
| Fourth |  | 12 | 20.0 |
| Did not respond |  | 14 | 23.3 |
| **Age group** |  |  |  |
| 19-21 |  | 7 | 11.7 |
| 22-24 |  | 19 | 31.7 |
| 25-30 |  | 10 | 16.7 |
| 30+ |  | 12 | 20.0 |
| Did not respond |  | 12 | 20.0 |
| **Worked in the education system** |  |  |  |
| No  |  | 22 | 36.7 |
| Yes |  | 26 | 43.3 |
| Did not respond  |  | 12 | 20.0 |

* 1. **Tools**

This study employed a mixed-methods approach to gain a comprehensive understanding encompassing both students and lecturers’ perspectives on teaching and learning in learning spaces.

* + 1. **Student Questionnaire**

The online questionnaire used to gather data from the student population was adapted from a study conducted by Menny-Ikan et al. [40], who developed a tool for assessing students’ experiences in learning spaces. The questionnaire included questions such as “What characterizes learning in this environment?” and explored the environment’s impact on motivation, interest, curiosity, and relevance.

The questionnaire also collected personal details such as age, gender, and year of study, along with factors describing the learning experience and questions about students’ engagement and attitudes towards active learning. Students were asked to rate their agreement with various statements using a Likert scale from 1 (to a small extent) to 5 (to a large extent). Before distribution, the questionnaire was validated and reviewed by an assessment and measurement expert.

Validation

The structural validity of the questionnaire was initially assessed using exploratory factor analysis (EFA) employing principal axis factoring (PAF) with oblique (Promax) rotation, which assumes interrelated factors [41]. After establishing the factorial structure, confirmatory factor analysis (CFA) was conducted.

The final EFA model identified three factors, leading to the exclusion of items 6, 8, and 16. CFA analysis suggested further excluding item 7. Subsequent adjustments resulted in fit indices ranging from satisfactory to very good (χ²/df = 1.51, p < .05, CFI = .90, GFI = .85, RMSEA = .09, pclose = .08), confirming structural validity. The items were organized into three categories based on factor loadings: “Emotional Engagement” (items 11-15), “Agentic Engagement” (items 1-4), and “Collective Engagement” (items 5 and 9). The internal consistency was satisfactory to good for all three factors (α = .82, .78, .70, respectively) and very good for the overall scale (α = .83).

The questionnaire was initially tested on ten students who were not part of the study to ensure reliability and validity, and was distributed to the 60 study participants only after these were confirmed. The questionnaire also included an open-ended question that allowed students to provide deeper, more nuanced insights or express feelings that were not captured by other questions (see Appendix 1).

* + 1. **Semi-Structured Interview**

A semi-structured interview guide was developed for interviewing lecturers teaching in the learning spaces. The interview included broad questions about their experiences, aimed at exploring their perspectives and gaining insights into their thought processes.

* 1. **Data Analysis**

Two content analyses were conducted: one for the students’ open-ended responses in the questionnaire and another for the transcribed interviews with the lecturers. The content analysis utilized open coding to identify and extract themes [42]. After coding, the statements were categorized into several significant themes for further analysis. Themes extracted from the students’ responses included their attitudes towards active learning in the learning spaces and their experiences with the lessons and lecturers’ practices. Themes extracted from the lecturers’ interviews encompassed their perceptions of the learning space, their teaching philosophies, descriptions of their practices, attitudes towards active learning, and more.

The quantitative data were analyzed using both descriptive and inferential statistics; descriptive statistics were employed to calculate means and standard deviations, while inferential statistics were used to assess the questionnaire’s structural validity. Factors derived from the questionnaire data were analyzed using a Pearson correlation matrix to explore relationships among identified factors, and multiple linear regression was conducted to identify which engagement factors predicted satisfaction with learning in the learning space.

1. **Findings and Discussion**

The current study aimed to explore the perspectives of faculty and students regarding teaching and learning processes in learning spaces.

* 1. **Student Outcomes**

To address the first two research questions: “How do students perceive their experiences in the learning spaces?” and “How do learning spaces contribute to student engagement in active learning?” - student attitudes were examined at the item level. Ratings of 1 and 2 were categorized as “low,” while ratings of 4 and 5 were categorized as “high.” Table 3 presents the items most frequently rated high and those most frequently rated low.

The table reveals that approximately 75% of the respondents reported acquiring and understanding the course content to a great extent, while nearly 70% indicated they worked independently. Just over 50% expressed satisfaction with their learning experience, and a similar percentage reported being active and involved in the learning process. Additionally, low ratings were most common among about 30% of the respondents. Further analysis of the frequencies shows that almost 30% of the participants engaged in group or pair work during lessons, either with other students or on collaborative documents, and about 25% found the studies interesting.

**Table 3. High and low questionnaire ratings (N=60)**

|  |  |  |
| --- | --- | --- |
| High  |  | Low |
| Item  | Frequency |  | Item | Frequency |
| 3. I am able to acquire and understand the course material. | 73% |  | 5. We work in groups or pairs during the lesson. | 30% |
| 15. I work independently. | 68% |  | 2. I collaborate and study with other students. | 28% |
| 10. I am satisfied with my learning experience (the quality of teaching, study material, and motivation to learn) compared to traditional learning methods. | 57% |  | 9. We work on joint documents (Google Docs, Google Slides, etc.) | 28% |
| 1. I am active and engaged in the learning process. | 57% |  | 12. The studies interest me. | 23% |

These data suggest that students engage in active learning in the learning spaces, with over half reporting satisfaction. However, the level of collaborative learning, a key aspect of active learning, is relatively low and appears to be insufficiently implemented in the learning spaces. Another surprising finding is that students’ interest in the learning occurring in these spaces is relatively low compared to their satisfaction, which is twice as high.

Based on the factor analysis of the questionnaire, the first factor (items 11-15) was labeled “Emotional Engagement,” as it reflects students’ emotional response towards learning in the learning spaces. The second factor (items 1-4) was labeled “Agentic Engagement,” as it encompasses items related to students’ intentions and proactive actions [32-33]. The third factor (items 5 and 9) was labeled “Collective Engagement,” as both these items focus on collaborative activities, where groups of students work together towards a common goal [43]**.**

To provide a comprehensive understanding of the factors derived from the questionnaire’s factor analysis, means and standard deviations of the item ratings within the three factors were calculated (excluding item 10, used as a dependent variable in this study). These descriptive statistics are presented in Table 4.

T**able 4. Means and standard deviations for the three factors derived from the questionnaire (N=60)**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | M  | S  |
| Emotional engagement |  | 3.54 | 0.83 |
| Agentic engagement |  | 3.55 | 0.92 |
| Collective engagement |  | 3.15 | 1.02 |
| Note: The ratings range from 1 (to a small extent) to 5 (to a large extent). |

The means indicate that responses were centered around the midpoint of the scale, despite a heterogeneous data dispersion. This points to a moderate level of student attitudes towards their emotional engagement in learning, however the mean does not reveal a definitive trend in the current sample. Analysis of variance revealed significant differences among the means (F(2,118) = 5.55, p < .01), and further analysis showed that students’ attitudes towards collective engagement were significantly lower compared to their emotional (p < .05) and agentic (p < .05) engagement attitudes. These findings suggest that learning in the spaces elicits more positive emotions such as enjoyment, interest, creativity, and effort compared to traditional classrooms. It also promotes agentic engagement, demonstrated by students’ active involvement in the learning process, collaborative work with peers, flexible use of the space, and their ability to comprehend and apply the taught material. However, collective engagement is comparatively lower, reflecting the relatively infrequent occurrence of collaborative work towards shared learning goals among students (30%, see Table 1).

A Pearson correlation matrix was conducted to examine whether the various aspects of students’ engagement in active learning spaces (emotional, agentic, and collective) were related. Table 5 reveals significant positive correlations between emotional and agentic aspects, as well as between agentic and collective aspects. However, no significant correlations were found between emotional and collective aspects. In other words, the more positive students’ attitudes were towards emotional aspects, the more positive they were towards the agentic aspects of their engagement, and the more positive their attitudes towards the agentic aspects, the more positive their attitudes were towards the collective aspects of their learning.

**Table 5. Pearson correlation matrix of emotional, agentic, and collective engagement factors (N=60)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Emotional Engagement** | **Agentic Engagement** | **Collective Engagement** |
| Emotional Engagement | -- | .49\*\*\* | .19 |
| Agentic Engagement |  | -- | .37\*\* |
| Collective Engagement |  |  | -- |
| \*\* p < .01, \*\*\* p < .001 |

To examine which student engagement factors predicted satisfaction with learning in the learning space, multiple linear regression was conducted. The three engagement factors (emotional, agentic, and collective) were entered into the regression model, with satisfaction with the learning space serving as the dependent variable.

**Table 6. Linear regression predicting satisfaction with learning spaces based on the three student engagement factors (N=60)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **B** | **SEB** | **β** | **t** | **P** |
| **Emotional engagement** |  | 0.43 | 0.14 | .32 | 2.97 | .004 |
| **Agentic engagement** |  | 0.56 | 0.14 | .47 | 4.08 | <.001 |
| **Collective engagement** |  | 0.06 | 0.11 | .05 | 0.52 | .608 |

The regression model was significant (F(3,56) = 18.62, p < .001) and accounted for 47.3% of the variance in satisfaction levels within the learning spaces (Adj. R2 = .473). The predictors analysis revealed that emotional and agentic aspects of student engagement significantly and positively influenced satisfaction levels, meaning that higher levels of emotional and agentic engagement were correlated with increased satisfaction. Among these predictors, agentic engagement was the most significant contributor to predicting satisfaction, while collective engagement did not significantly impact satisfaction levels. This indicates that the experience in the learning space proved to be highly valuable to students, enhancing both their emotional and agentic engagement and increasing their overall satisfaction.

* + 1. **Qualitative Analysis of Student Responses to the Open-Ended Question**

Qualitative analysis of students’ responses to the open-ended question revealed that out of approximately 20 verbal responses, only a minority (three) praised the teaching and learning experience in the learning spaces. Some were ambivalent, and most were negative.

Students who praised learning in these spaces expressed strong support for active learning methods and highlighted several advantages over traditional teaching methods; they found their learning more meaningful, the experience more enjoyable and interesting, and they appreciated being exposed to a teaching approach they aspired to implement in their future careers. For example:

*“Learning is much more fun when it’s active and collaborative. It’s a positive, educational experience. This is how I want to teach my students!”*

*“Active learning is invigorating. I wouldn’t be able to learn if I was just lectured to all day. It’s boring and the material doesn’t stick.”*

*“It requires more effort, attention, and focus, but in the end, the material sinks in and you don’t forget it immediately after the test.”*

As mentioned above, some responses were ambivalent, expressing the difficulty students face in adapting to the new teaching approach. Some noted that they had received no explanation or preparation for it:

*“I feel it’s a learning style that takes some getting used to. This is the first time I’ve come across this type of learning.”*

*“I find it challenging to adapt to creative and varied learning methods.”*

*“It’s essential to prepare us for this. It can be beneficial, but some students resist it because it’s different.”*

Some responses attributed the positive and negative experiences to the lecturers:

*“It depends on the class and the lecturer. Sometimes it’s good, and sometimes it makes things more difficult.”*

*“The learning is experiential, but it depends on the lecturer. Some do it well, and some don’t... You need to know how to teach effectively, and not everyone does.”*

However, a significant part of the negative responses stemmed from lecturers’ ineffective teaching methods:

*“I feel overwhelmed by the activities, collaboration, and group work - I get lost and don’t understand the material. The effort to be creative makes it harder for me to understand what’s being taught.”*

*“Sometimes it feels like in active learning spaces, we’re treated like little kids. It’s a difficult feeling. I came here to pursue higher education, I wanted to acquire advanced knowledge.”*

A response like the last one might explain the low interest level indicated in the questionnaire results. There were also students who sought to complete their classes with minimal effort and were not willing to step out of their comfort zone. For example:

*“I came here to get a degree, like I got my high school diploma. Study, take a test, and move on. I don’t have the energy to be active.”*

*“Personally, I prefer traditional learning. It’s easier for me to sit in front of a lecturer, get the information through an organized presentation, and take notes. When there are so many changes, I get overwhelmed. I just focus on the ‘burden’ of completing the assignment rather than learning the material.”*

*“I prefer it when the lecturer teaches and I listen, rather than doing group work. Sometimes these tasks are difficult because everything’s done on the computer, or there’s a lot of moving around in the class... Sometimes it’s nice, but not in every lesson.”*

The research literature documents diverse attitudes among students towards active learning [44-45]. This variability in learner attitudes reflects a spectrum of learning styles and preferences [46], highlighting the need for lecturers to adopt flexible teaching approaches to effectively cater to the diverse needs of students in heterogeneous classrooms. Moreover, students’ resistance to active learning may be influenced by their past educational experiences and limited exposure to student-centered learning approaches that require active engagement [47]. This issue is particularly relevant in addressing adult learners’ resistance, a well-documented challenge in implementing active learning [48].

Thus, based on the findings regarding the first two research questions, students generally exhibited moderately positive attitudes towards their experiences in the learning spaces. However, the notable finding regarding the lack of interest warrants further investigation. The findings also indicate moderately positive engagement across the three dimensions: emotional, agentic, and collective. Empirical support was found for the relationship between active learning and student engagement, as the study shows that the emotional and agentic aspects, which are interrelated, reflect students’ positive engagement in active learning within learning spaces. Nevertheless, analysis of students’ verbal responses and additional questionnaire findings reveal a nuanced picture that includes criticism of inadequate practices by some lecturers and misunderstandings about the essence and benefits of active learning, particularly its importance for future teachers.

* 1. **Lecturer Outcomes**

The interviews with the lecturers were analyzed to address the third research question regarding their perceptions of teaching in learning spaces and how these perceptions influenced their teaching practices. The analysis revealed three key challenges they faced: technological, techno-pedagogical, and challenges rea;ted to perceptual change.

* + 1. **The Technological Challenge**

Studies show that a majority of higher education lecturers recognize the potential of digital technologies for learning [49-50]. However, there remains a question as to why these technologies are not used more frequently? Researchers indicate that 44% of higher education lecturers rarely use digital technologies in teaching, and when they do, they tend to use the same technologies repeatedly. In other words, they use technology to support their lecturing style rather than integrate it into more student-centered activities [51].

The technological challenge of understanding the functionalities that learning spaces can provide is not a trivial matter. Despite the college offering training on utilizing and maximizing the technological resources in these spaces, only a few lecturers responded to the offer and received such training. Consequently, a considerable number of them admitted to being unfamiliar with the available technologies:

*“I’d be glad to learn how to use the functions available in the room.”* (Adi)

*“I’d like to use the screens and walls more. I need to learn and figure out how to do it.”* (Tzvia)

All but one lecturer stated that they were unsure how to effectively integrate the available technology to enhance their teaching. For example:

*“I’d like to learn and get more ideas for how to teach in the space and integrate technology, beyond just holding discussions.”* (Tamir)

*“I’d be happy to get more ideas because I really want them to work in groups, but I haven’t really done it because I didn’t feel ready…. But beyond that, I don’t know how to use the space to maximize my teaching.”* (Gitit)

* + 1. **The Technological-Pedagogical Content Knowledge Challenge**

Researchers argue that integrating technology into teaching cannot be limited to merely acquiring skills related to using specific tools or software [52]; lecturers require technological-pedagogical content knowledge (TPCK) [53] to effectively implement the technology at their disposal and enhance their teaching practices [54].

The interviewees acknowledged that utilizing the resources offered by the learning spaces could enhance their teaching, but that they lacked knowledge on how to do so. Therefore, lecturers require advanced training and ongoing support throughout the academic year.

For example, Hava wanted to leverage the resources for differentiated teaching but did not know how to do it:

*“I’d like to learn how to use the space to cater to the needs of every student, whether they’re strong or weak. To teach some of them new material while others can practice, I’d like to use and adapt the space to students’ different paces.”*

Or as Gitit reflects:

*“I feel like I’m not taking advantage of the space correctly. I pretty much use it like a regular classroom.”*

* + 1. **The Perceptual Challenge**

For lecturers to optimally implement TPCK, they must change their perception of the teacher’s role and of how people learn. The participants we interviewed indicated that their view of teaching was still largely traditional.

In response to a question addressing the challenges in promoting learning in the space, Avi replied:

*“It’s really more about keeping the class together, making sure everyone’s engaged and on board. It’s not the usual class structure. The usual structure is pretty much ruined, and this is a good thing... Here, knowledge circulates around the classroom, and you need to make sure everyone gets it. It changes the teacher’s role…”*

Avi’s approach to teaching is somewhere between traditional and innovative. He knows what is expected of him as a teacher in the learning space, yet his teacher-centered perception of teaching is still very present. For example, it is clear to him that when he speaks, everyone listens, and that he controls the knowledge he imparts to the students. When he refers to what happens during a class in the learning space, he sees knowledge as something tangible circulating around the room, which the students need to grasp. He is aware of the change in his role but is not entirely comfortable with it, perceiving the change as a loss of teacher control. Later in the interview, he states:

*“I don’t think all the courses at the college should be like this. If that were to happen the students wouldn’t know anything, they’d be ignorant and uncultured... There are things you absolutely need to know and you need to hear them from the teacher.”*

Gil admits that he is still finding his way:

*“I don’t know much about pedagogy... It’s my first time teaching in a space like this, and I feel that the environment affects my teaching... There seems to be an unwritten rule that there needs to be silence in the classroom, and I need to learn to let that go, be more in the flow. I used to come in and lecture because I wanted the students to understand the material. I think active learning is better, but I’m not sure it suits everyone. Many of them, who weren’t involved before, are more active now and learn more throughout the semester rather than just before the exam.”*

Gitit also admits that she still abides by the traditional teaching approach, yet she expresses a willingness and desire to change:

*“I’d be happy to get more ideas because I really want them to work in groups, but I haven’t really done it because I didn’t feel ready, and they don’t cooperate. But beyond that, I don’t know how to use the space to maximize my teaching… It makes me nervous, I’m worried that they won’t listen and they’ll be doing other things if I’m not talking and they work in pairs.”*

These lecturers illustrate how the traditional approach of “holding a class,” characterized by fears of losing control over the classroom and what takes place in it, and the belief that students only learn when the teacher is speaking, is still prevalent and deeply ingrained.

In contrast, some lecturers present a more learner-centered approach to teaching and learning:

*“Even when I taught in a regular classroom, I tried to accomodate a variety of students, encouraging them to be active in both individual and group learning. I still try follow these principles in a regular classroom, but it’s easier and works better in this space... In terms of the students’ achievements, I think they’re better. I can see the students, I know who’s with me, who’s working, specifically because I use collaborative and technological tools, so it’s much easier for me to track their progress. I think the learning experience is better because I see that they’re engaged and enjoying it. Overall, I think they learn better.”* (Hava)

Tzipora describes how she came to adopt a learner-centered approach and implement active learning in her classroom:

*“The change I made is that I am much less in control of the situation. I’m more relaxed, I make more of an effort to understand where the students are, and it’s improved their learning... Essentially, I think the major change is that I’m much more aware of where the students are at and much less concerned about where I’m at…”*

Some lecturers also addressed the difficulties students face. For example, Hava mentioned a challenge related to students’ attitude towards active learning:

*“I think some students enjoy the learning space, but on the other hand, as I said, precisely because the space promotes active learning, not all students want to be active. The classroom space is more open, and you can’t hide behind a computer or anything else, so some students might find it irritating.”*

These statements indicate that the learning space confronts lecturers with their teaching approach. They are aware of how the learning space encourages active learning, as well as what is expected of them as teachers. However, some are still not convinced that learner-centered teaching is the most appropriate and beneficial approach, as it does not align with their perception of the teaching and learning process.

The research findings reveal a complex reality. Evidence documented in interviews with lecturers indicates that many of them struggled to leverage learning spaces to promote active teaching and learning. This seems to stems from their difficulty in transitioning to a new pedagogical paradigm; they lack skills and knowledge related to active teaching and learning methods and they do not know how to effectively use the space for this purpose. Additionally, they struggled with relinquishing control and allowing students to lead the learning process, often resorting to traditional teaching methods, with which they are more comfortable and feel more in control.

Regarding the fourth research question, “What are the challenges and barriers students and lecturers face in promoting active learning in learning spaces?” both students and lecturers appeared to encounter difficulties and challenges, as the teacher-centered approach that has dominated the education system for years has left its mark on both. The shift to active learning, which allows the learning space to be more student-centered, is challenging for most of them, as it requires not only their full commitment but also appropriate preparation.

Some barriers stem from lecturers lacking the requisite technological knowledge and skills needed to integrate technology into their pedagogy effectively for fostering meaningful learning. Another barrier arises from lecturers’ perceptions of the teacher’s role, teaching methods, and the learning process. Those who view knowledge as transmitted primarily through teacher-centered learning processes find it challenging to transition to a more advanced and constructivist, learner-centered approach. Changing these perceptions is a crucial but long-term process, and without such changes being made, lecturers will be unable to implement pedagogies that support active learning [55].

Some students appear to hold similar views regarding their learning processes. They do not perceive the value in active learning and believe that passive learning, such as in lectures, is the most efficient form for them. Additionally, unsuccessful experiences in learning spaces reinforced their perception that active learning was more of a slogan than a substantive approach. Moreover, individual learning styles vary widely, posing a complex challenge for educational reform in higher education. It should also be noted that students are adult learners, characterized by goal-oriented learning focused on understanding the rationale behind what, how, and why they are being taught in a specific manner [56]. Therefore, the research suggests that when students did not receive explanations or justifications for their experiences in learning spaces, their responses were shaped accordingly.

1. **Conclusion**

This research indicates that the barriers and challenges faced by lecturers teaching in learning spaces, particularly those related to a lack of knowledge, can be addressed through guidance and support provided to pedagogical faculty tasked with integrating pedagogy, technology, and innovative teaching approaches such as active and collaborative learning. It is essential for every lecturer to undergo professional training prior to teaching in the space so they understand how to operate the room and the range of uses it offers.

Regarding the challenge of changing teaching perceptions, the lecturer’s role, and the advantages of advanced teaching approaches, lecturers should be encouraged to participate in learning groups that meet throughout the year to develop suitable teaching methods for the space. Such a learning community can support lecturers in their professional development and potentially facilitate the desired perceptual change.

Adopting a student-centered approach that promotes active learning can be complex and challenging for lecturers, particularly in terms of managing classroom dynamics and relinquishing control [57]. This is an ongoing process, requiring not only training on how to use the tools the room provides but also professional development throughout the year. Numerous articles argue that developing professionalism among higher education faculty is crucial, as it improves teaching, learning, and overall institutional success [58-59].

As for the barriers and challenges faced by students, it is vital to recognize that a student studying to become a teacher who does not understand the purpose of active learning lacks a crucial understanding of their role. Additionally, students, who are often adult learners balancing family and work responsibilities, may find it difficult to prioritize and appreciate the benefits of active learning. To address this, students must be educated about active learning, adequately prepared for learning spaces, and engaged in meaningful active learning experiences. Achieving this requires lecturers to design suitable activities and adapt their teaching practices accordingly.

In conclusion, the significance and contribution of learning spaces in higher education institutions, particularly in teaching colleges, encompass several key aspects. Firstly, learning spaces that facilitate active learning contribute to heightened student engagement in the learning process. These environments foster positive attitudes towards learning and empower students to take ownership of their learning. For teaching colleges, the value of students’ active learning experiences in these spaces is crucial, as successful experiences can profoundly influence their future teaching practices. Secondly, teaching in learning spaces presents lecturers with challenges to traditional teaching methods, which could potentially lead to changes in their perceptions and consequently their practices.

**Research Limitations**

This study’s limitations stem from its small sample size and focus on a single institution. Consequently, the findings may not be generalizable to faculty and students in teacher training colleges at large. Thus, a more comprehensive study involving multiple higher education institutions and a larger sample size is recommended to gain a deeper understanding of these issues. Future research should also investigate effective strategies for supporting faculty and students as they transition to more active, student-centered learning approaches and examine the impact of the physical learning environment in facilitating this process.

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**Appendix 1: Student Questionnaire**

Hello,

We are conducting a study on the quality of learning and satisfaction with learning spaces.

The purpose of this study is to gather information to help us understand teaching and learning processes in learning spaces at the college, and compare them to traditional teaching and learning processes (lectures, rows of desks).

We would greatly appreciate your participation!

When answering the questions, please refer to your learning experience in the learning space compared to your experience in a regular classroom.

**Part 1: Informative questions**

Which departments are you studying in? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Year of high school graduation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Campus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Year of study at the college \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Age \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Marital status \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Do you work in the education sector? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part 2: Questions about the learning experience in learning spaces**

1. To what extent are you involved and active in the learning process?
2. To what extent do you work and learn with other students?
3. To what extent do you succeed in acquiring and understanding the content conveyed in the course?
4. To what extent does the flexibility in organizing the learning space contribute to your learning?
5. Do you work in groups or pairs during the lesson?
6. Do you visit websites that are unrelated to the lesson?
7. Do you use the tables and walls in the space diversely during the lesson?
8. Do you learn as a class through lectures delivered by the lecturer?
9. Do you work on collaborative documents (Google Docs, Google Slides, etc.)?
10. To what extent are you satisfied with your learning experience (quality of teaching, learning materials, motivation for learning) compared to traditional learning?

**Part 3: Active learning versus traditional learning**

Please rate the extent to which you agree with the following statements:

1. I enjoy learning in the learning space
2. The studies interest me
3. I manage to be creative in learning
4. The pace of the lesson suits me
5. I work independently
6. I get easily distracted from what is being taught in the lesson

Open-ended question:

I wanted to add:

**Appendix 2: Interview questions for lecturers**

* Please describe the way you teach secondary topics in the learning space (ask only if the lecturer makes no reference or insufficient reference to them. As follow-up questions:) Ask for an example or a specific case/lesson that illustrates their teaching methods. What elements in the learning space do you use primarily, which do you use less, and why?
* What do you think is missing in the learning space to optimize the quality of your teaching?
* How long have you been teaching in learning spaces?
* Has your teaching in learning spaces changed over the years/courses? Please provide examples.
* To what extent are you satisfied with your teaching methods? Why? What challenges do you face as a teacher in a learning space?
* What are the principles for optimal teaching in your view? To what extent do you operate according to these principles in the learning space? Please provide examples.
* How do you think students experience learning in the space? Please provide examples.
* Please describe your teaching in the space compared to regular classrooms. What methods do you use in the space compared to regular classrooms? Has your teaching in a regular classroom changed as a result of your experience in the learning space? If so, in what way?
* Please describe the students’ quality of learning and their achievements in the course you teach in the space. What do you think contributes to or hinders their learning?
* Do you have any suggestions regarding what should be improved, modified, or preserved?