

Experiences and Level of Acceptance of Students in using Knowledge Hub as Learning Management System

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Abstract: This study aimed to examine and analyze the experiences and acceptance levels of students at the Philippine Science High School - Ilocos Region Campus (PSHS-IRC) in using the Pisay Knowledge Hub (KHub) as a Learning Management System (LMS) during the academic year 2020-2021. A mixed-method research approach was utilized. The Likert scale interpretation was employed to understand the level of acceptance, and the Technology Acceptance Model was implemented to comprehend the students' experiences. Based on the gathered data, the study revealed that students generally accepted and agreed with the use of KHub as a LMS, as evidenced by the following aspects: satisfaction ($x=3.67$), usefulness ($x=3.77$), and ease of use ($x=3.73$). The study also identified four themes that shaped the students' experiences in using KHub: strengths, weaknesses, challenges, and recommendations. Strengths refer to the positive experiences that students liked about using the LMS. In contrast, weaknesses explain the unfavorable experiences. Regarding the theme of challenges, it encompasses the technical issues and features of the LMS that posed problems when used. Lastly, the recommendations' theme relates to the students' suggestions for improvement. Considering these findings, the following recommendations are made conduct further investigation and analysis of teachers' experiences in using LMS-KHub, address the challenges experienced by students in using instructional technology, maintain and continue the use of KHub as a Learning Management System in teaching and learning, and provide intensive training on it.

Keywords: Experiences, Learning Management System (LMS), Online Learning, Knowledge Hub

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INTRODUCTION

The biggest problem the world is facing today is the COVID-19 pandemic (World Health Organization, 2020). Every aspect of daily life is affected because there are limited activities that can be carried out to minimize interactions with others in the hope of stopping the spread of this disease. In response to this, schools have decided to continue classes through online blended learning. This has led schools to use various Learning Management Systems (LMS) based on what they believe is best for students, as traditional face-to-face classes are not feasible. LMSs have been in existence even before the pandemic, and they are used by students for electronic learning (E-learning) (Dragilev, 2019). These are also referred to as virtual learning environments with the primary goal of providing a "classroom" that can be accessed using technology. There have been numerous studies on the usability of various LMSs, such as Moodle, as studied by Ortiz (2017) based on the experiences of students from Las Piñas City, Philippines, and Acadox, as studied by Abdel-Maksoud (2018) based on the experiences of students in Saudi Arabia. These studies have yielded positive responses regarding the use of LMS, but one aspect that has not received much attention is whether students and teachers find it easy or difficult to adapt to the implementation of these LMSs (Ortiz, 2017; Abdel-Maksoud, 2018). According to the research conducted by Rahrouh et al. (2018) at Al Ain University in the United Arab Emirates, despite the university's long-time use of Moodle as an LMS, both teachers and students have not fully utilized its potential. This is linked to their lack of understanding of the LMS even though they have undergone extensive training in its use. Therefore, it is necessary to focus on the users of LMS and their perceptions of its use (Rahrouh et al., 2018). In response to the needs of many schools for an appropriate Learning Management System and the need for further research on other LMSs, the aim of this research is to understand the perception of students at the Philippine Science High School – Ilocos Region Campus (PSHS-IRC) regarding the

use of the Pisay Knowledge Hub (KHub) as a Learning Management System.

Review of Related Literature and Studies

E-learning or electronic learning is the process of learning through technology and electronic devices (Tamm, 2019). It operates using electronic means, usually conducted over the Internet, where students can access their study materials online from anywhere and at any time. According to Tamm (2019), this often takes the form of online courses, online degrees, or online programs. Based on research conducted by the Association for Talent Development in 2017 titled "Next Generation E-Learning," 89% of their employees acquired various skills, from using simple keyboard shortcuts to gaining knowledge in their studied topics. This demonstrates that the e-learning approach is suitable for everyone and represents a revolution in the field of education. Another testament to this is the ease of access, comprehension, and information sharing at any time and from anywhere.

Due to the effective use of e-learning, various schools, including the Philippine Science High School System, are encouraged to incorporate it into their current learning styles, especially in the current pandemic situation. A Learning Management System or LMS, also commonly referred to as a virtual learning environment, is one of the crucial tools used in e-learning. It is a comprehensive software that supports the creation, delivery, assessment, and management of courses in traditional face-to-face, blended, or online learning environments (Seo, 2019). According to Wright et al. (2014), LMS software is used by institutions to plan, implement, expedite, evaluate, and monitor student learning. LMSs focus on course preparation, providing educational materials, delivering, monitoring student activities, and efficiently aggregating and presenting student grades (Wright et al., 2014). Furthermore, all activities are conducted behind a virtual wall, ensuring the privacy and security of data without much compromise. Commonly used LMS software in renowned colleges includes

Blackboard, Instructure Canvas, Moodle (Modular Object-Oriented Dynamic Learning Environment), Desire2Learn, Pearson Learning Studio (formerly known as eCollege), and Sakai (Wright et al., 2014).

Moodle is a learning platform designed for students around the world, created to provide teachers and students with a robust and secure learning environment (Moodle, 2020). It is user-friendly, up to date, can be accessed anywhere, anytime, on any device, and is supported by strong and well-known international communities, making it widely used (Moodle, 2020). One example is the University of Ljubljana, where the research by Keržič et al. (2017) showed significant grade improvements for students after the introduction of Moodle as their Learning Management System. In a school in Ghana, Hanson & Asante (2014) discovered that using Moodle, they gained a significant amount of knowledge as well as technological skills. Furthermore, both teaching and learning methods improved, benefiting both teachers and students (Hanson & Asante, 2014). According to Tambe (2015), various features of Moodle, such as assignment submissions, messaging, class announcements, attendance tracking, session plans, and academic calendars, greatly assist in navigating the Learning Management System. However, not everyone has the same experience. In a study conducted at the University of Aveiro in Portugal, Moodle was perceived as merely a repository for educational materials, yet students recognized the importance of continued use of this platform to support their learning process (Costa et al., 2012). In such studies, student perceptions are measured using various research tools such as the Likert scale (Moohamad et al., 2014) and the Technology Acceptance Model (Davis et al., 1989).

Likert scale interpretation is a tool developed by American social psychologist Rensis Likert. It is commonly used to measure people's perceptions, emotions, and behaviors, aiding in psychology and marketing-related research (Moura, 2020). The Likert scale is embodied in a set of response options comprising various

opinions in a study, used to indicate the degree of agreement and disagreement of the respondent. It is often used in close-ended questions or questions with pre-identified response options. The scale can range from a Likert 5-point scale or more options, including a neutral choice, and other responses representing different degrees of agreement or disagreement (SurveyMonkey, 2017). Most perception-related studies use the Likert scale, such as the research by Al-Malki, AbdulKarim, and Alallah (2015) on initial perceptions and satisfaction with the use of the Blackboard LMS in teaching and learning by both teachers and students. Their study employed a Likert 5-point scale with response options including strongly agree, agree, neutral, disagree, and strongly disagree. Furthermore, Abdel-Maksuod (2018) also used a Likert 5-point scale in his research on the satisfaction of students with the use of Acadox LMS and their perception of its importance and ease of use. It is more suitable for studies related to perception, satisfaction, and more, as it provides a wider range of options than just "yes" or "no" and is easier to analyze since it provides quantitative equivalents. It also helps alleviate societal pressure when responding to survey questions (McLeod, 2019).

On the other hand, the theoretical foundation of this study is the Technology Acceptance Model (TAM) introduced by Davis et al. (1989). This model is used to understand the factors that affect users' satisfaction with new technologies. TAM has gained significant attention from IT researchers because it has a strong theoretical foundation, based on the theory of reasoned action by Fishbein and Ajzen and the theory of planned behavior by Ajzen. This model uses individual perceptions of usefulness and ease of use to determine user attitudes toward adopting new technological systems, such as learning management systems (LMS). According to TAM, if a technological system is easier to use and more useful for users, it is more acceptable to them (Weng et al., 2018). TAM is widely used in research and the development of successful IT applications, and it has also been proven to effectively

identify users' technology acceptance behavior (Cheon et al., 2012). In the context of e-learning and LMS, TAM has been used in the research by Ortiz (2017), Ghazal et al. (2018), Horvat et al. (2013), and Shin and Kang (2015) to assess the overall perceptions of users of different learning management systems and the impact of their use on their learning. Abdel-Maksoud (2018) also employed the concept of TAM in designing survey questions and found that students' perception of the usefulness and ease of use of the LMS significantly affects their satisfaction with its use.

Research Objectives

This study aimed to examine the experiences of students at the Philippine Science High School - Ilocos Region Campus (PSHS-IRC) in using KHub as a Learning Management System. Overall, this research sought to answer the following questions: What is the level of acceptance of students in using the Learning Management System based on: Satisfaction Perception of usefulness Perception of ease of use?; What are the predominant themes in the experiences of students using the Learning Management System?

METHODS

Study Design

This study utilized a mixed methods approach, which combines quantitative and qualitative designs. According to Alahmari (2018), using a combination of both methods is more beneficial in understanding research questions than using only one. Additionally, mixed methods help neutralize weaknesses and expand the capabilities of each approach. Since research is a complex and interdisciplinary process, the use of mixed methods is advantageous because qualitative and quantitative methods complement each other (Alahmari, 2018). It followed a sequential explanatory design, like the studies of Alahmari (2018) and Alqahtani (2019) that focus on e-learning frameworks, as this design provides a more detailed understanding of the studied issue and offers a broader perspective to enhance

knowledge about the students' experiences gathered from both qualitative and quantitative methods.

Population and Study Location

The study's population included the students at the Philippine Science High School - Ilocos Region Campus for the survey and interviews. Sixty students were chosen as participants in the survey, with 10 students per grade level selected through random sampling. From the selected students, researchers conducted interviews with those who agreed to participate. The interviews were conducted virtually using social media platforms such as Google Forms and Messenger.

Study Instruments

The instruments used for this study were the survey and interviews, both conducted online using Google Forms and Messenger. The survey used was adapted from the questionnaire used in Abdel-Maksoud's study (2018). The first section of the survey contained questions regarding respondents' demographic information, while the subsequent section focused on the students' experiences with KHub, divided into three themes: satisfaction with KHub, perceived usefulness of KHub, and perceived ease of use of KHub. A Likert 5-point scale was used to measure the three aspects of the survey, where respondents scored various factors related to their experiences with KHub (Abdel-Maksoud, 2018). In addition to these questions, respondents were asked if they could be interviewed for a deeper understanding of their overall experiences. Through online interviews, respondents were asked about their perceived strengths and weaknesses of KHub, the problems they encountered while using KHub, and their recommendations for improving the use of the Learning Management System.

Data Collection Methods, Data Analysis, and Ethical Considerations

Using Google Forms, the researchers created a survey containing questions that

needed to be answered by the respondents. The survey included demographic information of the respondents and questions related to students' experiences using KHub as a Learning Management System, utilizing a Likert 5-point scale. The interview questions were documented in Word or Google Docs to be ready for the interviews with the students. The selection of survey respondents was done using the random sampling method. Only 10 students from each grade level were chosen, resulting in a total population of 60 respondents from PSHS-IRC. The ten selected students from each grade were asked if they agreed to be interviewed for the study. Those who agreed became the interviewed participants for the researchers. The survey was distributed to selected students through Messenger. The responses were automatically recorded through the Google Form provided to the respondents, and the responses were summarized after the completion of the survey. Interviews were conducted via chat or call on Messenger with the participating

students who agreed to be interviewed. The questions prepared were asked to each student, and their responses were documented and summarized in the end. From the conducted survey and interviews, the responses were summarized and subjected to descriptive analysis. During the analysis, the researchers calculated the mean or average scores given by the students for each statement based on the Likert scale. Subsequently, the average means for each statement were computed for each theme (satisfaction, perceived usefulness, and perceived ease of use). The interpretation of the analyzed data was carried out by interpreting the overall averages for each section using the slightly modified Likert scale interpretation table by Moohamad et al. (2014) and by applying the principles of the Technology Acceptance Model developed by Davis et al. (1989), which is based on the behavioral theory that technology acceptance by users is influenced by satisfaction, perceived usefulness, and perceived ease of use (Ortiz, 2017).

TABLE 1. *Likert scale interpretation based on Moohamad et al. (2014)*

Likert Scale	Value Allocations of Mean	Description
5	4.50-5.00	Strongly Agree (SA)
4	3.50-4.49	Agree (A)
3	2.50-3.49	Neutral (N)
2	1.50-2.49	Disagree (DA)
1	1.00-1.49	Strongly Disagree (SD)

RESULTS AND DISCUSSION

Level of acceptance of students in using the Learning Management System

The survey components to determine the level of students' acceptance in using KHub were divided into three parts: satisfaction with KHub usage, perception of KHub's benefits, and perception of the ease of using KHub. In each section, respondents were presented with statements to which they assigned

scores using a Likert 5-point scale based on their level of agreement. The average score given by respondents for each statement was computed, and the overall average for each section was also calculated by averaging the average scores of all the statements. The survey results for each section are summarized in Tables 2, 3, and 4.

Satisfaction with KHub as Learning Management System

TABLE 2. *Satisfaction with KHub usage*

No.	Statement/s	Mean	Interpretation
1	The materials I learned from KHub are valuable to me.	4.33	SA
2	Discussions in the courses available on KHub are effective.	3.88	A
3	Studying using KHub has increased my knowledge of course	4.13	A

	content.		
4	I feel that my time spent using KHub is worthwhile.	3.52	A
5	I have a positive feeling about KHub.	3.60	A
6	I am satisfied with the quality of my learning using KHub.	3.50	A
7	I did not encounter any problems using KHub to access course materials.	2.70	N
	Studying with KHub is enjoyable.		
8	I would recommend KHub to other students or schools.	3.27	N
9	I am content with studying using KHub.	3.70	A
10	I see the reason for using KHub in my studies.	3.73	A
11	I am satisfied with the services provided by KHub.	4.22	A
12	I want to continue using KHub in the future.	3.78	A
13		3.38	N
	Grand Mean	3.67	Agree

The statements regarding students' satisfaction with the use of KHub and the corresponding average level of agreement among respondents for each statement were recorded in Table 2. For this section, the overall average score is 3.67. Based on the slightly modified Likert scale interpretation table by Moohamad et al. (2014), an average or mean of 3.67 indicates agreement with the statements in general. Since the meaning of the statements in this section leans towards positive satisfaction of students with KHub, having an average of 3.67 implies that students are generally content with the use of KHub as an LMS. According to the studies of Abdel-Maksoud (2018) and Ortiz (2017), one of the influencing factors in positive acceptance and intention to use new technologies according to the Technology Acceptance Model (TAM) is satisfaction

with the system. Al-Busaidi and Al-Shihi (2011) also suggest that user satisfaction with technology is crucial as it determines whether they want to continue using the system or not. In line with these findings, the average score of 3.67 suggests that students' satisfaction with KHub positively contributes to their acceptance of the system, and they are inclined to continue using it as an LMS.

Benefits of KHub as Learning Management System

Table III displays the statements regarding the perception of the benefits of KHub and the average level of agreement provided by the students. This section obtained an overall average score of 3.77.

TABLE 3. *Benefits of KHub*

No.	Statement/s	Mean	Interpretation
1	My use of KHub has expanded my knowledge in the subjects of my courses.	4.00	A
2	My use of KHub has helped improve my skills in my core subjects/major subjects.	3.82	A
3	Studying through KHub has enhanced my proficiency in using online platforms.	4.13	A
4	My use of KHub has contributed to my increased productivity.	3.47	N
5		3.92	A
6	Overall, KHub is beneficial for me.	3.58	A
7	KHub aids me in completing my tasks more quickly.	3.45	A
	The quality of my work has improved after using KHub.		
	Grand Mean	3.77	Agree

For the overall average score of 3.77, this signifies the agreement of the students regarding the usefulness of PSHS-

IRC KHub, based on the utilized Likert scale interpretation table (Moohamad et al., 2014). This holds true for all the statements

in this section because the average scores range from only 3.45 to 4.13, supporting the idea that they perceive KHub as a valuable LMS. Furthermore, this agreement aligns with the principles of the Technology Acceptance Model (TAM), which states that "perceived usefulness significantly influences users' behavior and intention to use technology" (Davis et al., 1989; Ortiz, 2017). Because of the positive perceived usefulness, behavior and intention are affected, leading to the continued use of this LMS. Therefore, the average of 3.77

indicates that KHub is beneficial and can be relied upon for continued use by the students.

Ease of use of KHub as Learning Management System

Table IV presents the statements about the students' perception of the ease of use of KHub and their average level of agreement. The overall average from this section is 3.73.

TABLE 4. *Ease of use*

No.	Statement/s	Mean	Interpretation
1	The layout of KHub is user-friendly.	4.05	A
2	I don't encounter any issues with using KHub.	3.07	N
3	The layout structure of KHub is well-designed.	3.68	A
4	The layout design of KHub is easy to read and navigate.	3.88	A
5	Overall, I am satisfied with the user-interface design of KHub.	3.78	A
6	KHub is easy to use for studying.	3.88	A
Grand Mean		3.73	Agree

The overall average score in this section is 3.73 from the conducted survey, indicating the respondents' agreement that KHub is easy to use based on the Likert scale interpretation table (Moohamad et al., 2014). Each statement regarding the ease of use of this LMS shows agreement as the average scores for these statements range from 3.07 to 4.05 only. This agreement implies that the students accept KHub as an LMS because, according to TAM, their perception of ease of use is an important factor (Abdel-Maksoud, 2018). Since the students find it easy to use, they are more likely to prefer using it for studying because they perceive it as requiring minimal effort to learn how to use (Abdel-Maksoud, 2018).

Experiences of students in using the Learning Management System

In the interview part of the study, respondents provided deeper insights into their experience with KHub by sharing their perceived strengths and weaknesses of KHub, problems they encountered in using KHub, and their recommendations to further improve KHub.

Strengths of KHub as Learning Management System

The students mentioned several strengths of KHub, including its "completeness" in terms of its content and the organization of its system. According to the students, it's beneficial that KHub has everything they need for their LMS in one place, such as learning materials, quizzes, submission bins, assessments, grades, and class announcements, all accessible on a single website. They also appreciate the organization of courses for each quarter and topic, making it easy to find and review materials and their own outputs. Many students find the calendar feature in KHub useful as it displays all the assignments for the entire month along with their respective deadlines, helping them manage their time effectively. They also find the flag function and navigate panel valuable when answering quizzes, making it easier to revisit unanswered questions or change their responses. The simple yet efficient design of KHub is also considered a strength because it simplifies the understanding and use of the LMS.

The students' perception of KHub's completeness aligns with the description of Moodle by Yildiz et al. (2018), an open-source learning platform on which PSHS-IRC KHub is based. Moodle offers a wide range of functionalities like assignments, quizzes, forums, discussion boards, newsletters, and content management, making it valuable for educators in preparing web-based courses. The organization provided by Moodle, which simplifies revisiting uploaded materials and reviewing student outputs, was also identified by the students as a motivating factor, consistent with the findings of Aikina and Bolsunovskaya (2020). The calendar feature and its notifications were seen as advantageous by the students, and this aligns with the results of Hasan's (2018) study on Moodle, where the platform was credited with tracking students' required tasks and deadlines effectively. Furthermore, the students' perception of KHub as a valuable LMS is consistent with the principles of the Technology Acceptance Model (TAM), which states that user behavior toward technology acceptance is influenced by perceived usefulness (Abdel-Maksoud, 2018). Hence, the average score of 3.77 indicates that KHub is perceived as beneficial by the students, contributing to their continued use of it as an LMS.

Weaknesses of KHub as Learning Management System

Despite its strengths, the students also identified several weaknesses in KHub. The most mentioned issue is the website crashing, particularly during quiz weeks. Many students pointed out that a strong internet connection is necessary when using KHub, as slow loading times affect their ability to access the website. Since most quizzes on KHub have time limits, students often run out of time waiting for the website to load, resulting in difficulties during quizzes. Some students also find the interface of KHub less appealing compared to other LMS platforms and struggle with its navigation, as it is not as intuitive. In terms of submitting assignments, the inconsistency of settings in different classes was mentioned, with some classes

automatically marking the checkbox upon submission and others not. Additionally, the file size limit for uploads in submission bins is considered limiting, prompting the use of other platforms like Google Drive for submitting large files. The technical problems mentioned by the students, such as slow website loading and difficulties with file uploads and downloads, are consistent with the demotivating factors identified in Aikina and Bolsunovskaya's (2020) study on Moodle-based learning. Technical difficulties and system failures, including frequent crashes of the LMS, were the most mentioned demotivating factors in their study. The challenge of submitting assignments using KHub aligns with the findings of Hasan's (2018) research on Moodle-based LMS, where assignment submission difficulties negatively affected student engagement. The limitation on file size uploads was also mentioned by the students and was identified as a weakness of the LMS, leading to the use of alternative platforms for uploading large files, consistent with the findings of Qutechate et al. (2020) regarding the use of Sakai LMS.

Issues Encountered in KHub as Learning Management System

Students reported encountering various problems when using KHub. They often experienced slow website loading and file uploads, especially during quiz weeks, and website crashes were a common issue, particularly when many users were online. Some students expressed the need for a strong internet connection when using KHub, as slow loading times significantly affected their ability to access the website. Due to the time constraints imposed by quizzes on KHub, students often felt rushed when waiting for the website to load, resulting in time management challenges. Some students also found it challenging to navigate through the platform and locate course materials, especially when previous quarter's materials were mixed with the current ones. Additionally, some students faced difficulties in submitting assignments, such as not being aware of the "submit assignment" button after clicking "save changes" and encountering issues with

submission boxes on the website. Students also experienced problems with submitting annotated PDFs, with missing details when viewing them on the website but complete details when downloaded. The Turnitin feature in KHub, which identifies plagiarized work, was noted to have high standards. In response to these technical issues, maintenance for the website was conducted, but it often took longer than scheduled, according to the students. Many of the technical problems experienced by the students, including slow website loading and challenges with file uploads and downloads, were among the most frequently reported demotivating factors in the study by Aikina and Bolsunovskaya (2020). These challenges align with the technical difficulties and system failures highlighted in their research, especially the frequent crashing of the LMS when many users were online. The difficulty in submitting assignments in KHub is consistent with Hasan's (2018) study on Moodle-based LMS, where assignment submission issues were negatively associated with student engagement. The limitation on file size uploads was also mentioned by the students, aligning with the weaknesses identified in Qutechate et al.'s (2020) research on the use of Sakai LMS.

Recommendations for KHub as Learning Management System

Despite the weaknesses and challenges faced by students, they provided recommendations to enhance the use of KHub. It was recommended to improve website loading speed and file upload efficiency. Expanding the website's capacity to accommodate more users and prevent crashes during peak usage times was the most frequently suggested solution, given the recurring issue of website crashes. Regarding quiz submissions, making them not case-sensitive to avoid issues with answer correction was recommended. Implementing automatic login and avoiding media usage, which some students considered unnecessary, were proposed to help save storage space. Furthermore, enhancing the website's design, including

introducing a dark mode, and improving the mobile application were suggested. It was also recommended to provide clear course outlines, lists of quizzes, and semester requirements at the beginning of each semester to avoid unnecessary delays. Consistent notifications and reminders for assignments were advised to be integrated with other calendar applications. To improve the services offered by KHub, regular maintenance, preferably on Sundays, was recommended.

The recommended website design improvements align with the suggestions of Ankrah and Darko-Adjei (2020) to make the platform more visually appealing. The call for clear course outlines, quiz lists, and semester requirements is supported by the need for coordination between the LMS administration and educators, as highlighted in Aikina and Bolsunovskaya's (2020) study.

CONCLUSION

Overall, the students at the Philippine Science High School - Ilocos Region Campus generally express agreement regarding their satisfaction, the usefulness, and the user-friendliness of KHub as a Learning Management System. Their experiences highlight strengths such as the completeness of requirements and the ease of navigating the website. They also acknowledge weaknesses, including technical issues and frequent system crashes. Additionally, they point out problems related to maximizing the full potential of KHub and offer recommendations, with a primary focus on expanding the website's capacity.

Recommendations

Based on the results of this research, the following recommendations are made for future studies: investigate the relationships between satisfaction with LMS usage, perception of its usefulness, and perception of its user-friendliness through statistical analysis to gain a deeper understanding of the effects of these variables; include additional variables, such as academic performance of the

respondents, to examine the overall impact of students' experiences with KHub; explore satisfaction and perceptions of usefulness and user-friendliness of the LMS among teachers as well; future research in this field, conducted within the same institution, should focus on implementing the recommendations provided by the students in this study to enhance KHub. This may include efforts to speed up website page generation time, strengthen and stabilize the website to prevent frequent crashes during high traffic, improve the website's interface, and reorganize course layouts for better organization.

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