

**Promoting Technology Literacy Skills through Problem-based Learning Integrated with
TPCK Model**

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Introduction

Brief Context

Like many other countries, the Pakistani Government had to implement the decision of starting online classes during COVID-19 pandemic. We had never used online learning management tools in our college before, so it was a huge task for the college management. As it was the only solution to keep the workflow, we had to come up with an effective solution in this regard. The college where I teach, there are some permanent senior teachers who had used various online learning tools before, but they did not use it on a regular basis. (Permanent teachers are hired by the Government and serve until they retire at the age of 60. They get allowances like health allowance, conveyance allowance and other benefits like medical leave, study leave, extra ordinary leave, or maternity leave with pay. These teachers not only teach, but they must perform all the administrative duties assigned to them occasionally. They perform election duties whenever there is district, provincial or general election in Pakistan. They perform their duties during various pandemics and fund-raising campaigns also. Before joining the service, they are trained for 14 to 15 days)

The problem of not utilizing online literacy skills was more noticeable in the new hires that are College Teacher Interns. CTIs are the teachers hired by the Government of Pakistan for one year. These teachers are hired and recruited in the Government colleges only. They don't have any benefits like leaves with pay or allowances, but they can be assigned all the duties that the Government may ask them for. Interns are hired and paid by the institutes themselves. They are hired for almost 11 to 12 months and do not get any benefits or allowances except monthly stipend. The prior duty of both CTIs and Interns is to teach different semesters and they also help the permanent teachers in different administrative duties. These Interns and CTIs come with zero

or minimum teaching experience and follow the traditional methods of teaching. We came to know that all of them had heard about various online learning tools but did not have the experience of using them. They did not consider their knowledge of online learning management tools to be sufficient. They wanted complete guidance and training for an effective online learning environment. So, it was noticed that this training was of fundamental importance for the new teachers.

Needs Analysis

As a co-coordinator of the BS Honors program, I know how burdened we were to execute online learning in our college (BS Honors is a graduate program consisting of 8 semesters. It has 11 disciplines in our college. Except for the Information Technology discipline, all other disciplines have almost the same course outlines for the first 4 semesters, and for the rest of the 4 semesters, students study their major subjects). We had to prepare our new teachers mentally for this sudden change. We had never used online learning in our institute and like many teachers in the other parts of the world, the new teachers at our college took it as a challenge. I arranged online meetings with two of our CTIs about the problems they face being the new hires. (Existing CTIs will be leaving college in the mid of October. CTIs' recruitment process starts in Mid-September) I have noted the minutes of the meetings and I recorded their responses in writing. After talking to them, I came to know that there were some new teachers in various departments like the Information Technology department, who used online learning tools as their personal preferred choices, but the major group of new teachers had never used an online learning tool before. They knew how to use technology and it was not impossible for them to learn about an effective learning management tool. The major problems that I came across through these teachers' responses are as under.

Both the teachers complained that they face a lot of problems in teaching online. They have created groups on WhatsApp for different classes. Classes consist of more than 90 students. They record their lectures and post them in the chat box. Sometimes they must take the pictures of the content material and upload them in the chat box. Students first type their roll numbers in the chat box and then upload their assignments there. It is very difficult for the teachers to go through those files individually and they get confused. In their confusion, they often check the wrong assignments and give their feedback to other students who did not write those assignments. Some students take pictures of their handwritten assignments which are extremely difficult to read.

The teachers cannot provide their feedback for those assigned tasks effectively. Teachers ask the students to prepare their assignments in Google Docs so that they may give them feedback on their docs. Some students do that but most of them don't. Students are usually late in submitting their assignments and they ask many times where to post the assignments. Sometimes they email their assignments to teachers. Teachers have also provided Zoom links to students, but they cannot meet all of them at once. They have created groups that meet when it's their turn. The teachers also added that students usually keep their cameras off and they cannot know whether the students are attentive or not. All they do is prepare their lectures by reading the textbooks, deliver them on Zoom, sometimes record their lectures and send them on WhatsApp, ask students to listen to the lectures, tell the teachers if they have any confusion and they assign homework to students. It is a tiring and time-consuming job for both the teachers. The teachers face a lot of mismanagement and despite putting effort, they don't get fruitful results. Many students get neglected and many assignments remain unchecked for a longer period. Results get delayed and teachers are unable to fix the emerging problems.

They do not have a common platform where they can share their instruction material, provide feedback, talk to the students, assign tasks, and grade their assignments. The teachers also mentioned this problem that being new here especially when it's COVID, everything seems scattered and both teachers and students are in a state of confusion. Teachers were just given the syllabus, course outline, timetable, and were informed about the recommended books. They were not trained at all. They did not have any personal meetings with the authorities to teach students effectively. Sometimes, their students did not take them seriously as they did not respond at all. It seemed that students did not take any interest in their lectures. BS Coordinator was also reported about this issue several times by these teachers.

As a result, the need emerged that our office should conduct a training program for our new teachers who could learn to use online learning platforms for a smooth flow of teaching and learning purposes. An effective teacher training system can produce quality teachers who are committed, pedagogically sound, and concerned about student learning and development (Siddiqui et al., 2021).

The above context suggests that the problem of untrained and inexperienced teachers is the existing problem at my college in Gujranwala, Pakistan. CTIs/Interns who have no experience or training, will not be able to counter online learning problems. From my personal teaching experience, I know that CTIs/Interns already depend on senior teachers and seek their help for effective methods of teaching. It was obvious that lack of self-efficacy and over dependence on senior teachers would create many problems in managing online learning environments. The orienting context suggests that new hires are not trained to use online learning management tools. The need for proper teacher training emerges in this scenario so that the new

hires become self-sufficient in solving the problems of online classrooms by adopting certain technology literacy skills especially in the context of emergencies like COVID-19.

The HOD of Information Technology was specially approached in this regard. She gave us some options like Google Classroom, Moodle, Google Meet, and easyclass.com. She had been a part of various research-oriented training programs before, and she willingly took the responsibility to guide me about conducting this training. She also added that we did not have a learning management tool or a portal system in this college before. This training would be an additional help for all our teachers to set a common platform for the students, where students could interact with them easily and all classroom activities could be performed through that learning management tool in a smooth way. According to her, the online learning tool would not only be helpful during the pandemic, but we could keep it as a standard learning management tool after the pandemic was over.

As the HOD of the IT department had shown her willingness to guide me, I requested her to be my SME based on her training experiences. The subject-matter expert is qualified to provide information about content and resources relating to all aspects of the topics for which instruction is to be designed (Morrison et al., 2010). She talked to me about this problem, and we discussed it in detail. She is Associate Professor at our college. Her subject is Networking. I had an online meeting with her for about 45 minutes. She talked about all the problems that the new teachers were facing regarding online learning. She told me that more than 70 percent of students were unsatisfied with CTIs/Interns. She prepared a report based on teachers' problems, students' progress reports, students' complaints, discussions in the staff room, and face to face meetings with BS In-charge, and Coordinator of BS program (Appendix A)

I also conducted a survey in this context. I emailed the survey questions to my colleague (Coordinator of BS program). She helped me complete that survey. After completion, she took pictures of those surveys separately and sent them to me. 11 students were selected randomly from all the disciplines. I got mixed responses but not even a single student was completely satisfied with their teachers, especially CTIs/Interns.

Now we had to select a specific tool that could be easy to access, learn, and use. It was also important to consider a tool that could be compatible with the devices that teachers used. The HOD of the IT department preferred to use Google Classroom as everyone could access it easily by creating a Gmail account or using the existing Gmail accounts. Google Classroom is a free web tool designed by Google for educational institutes that is easy to create, distribute, and grade assignments. Students and teachers can share files and organize their data with comfort and simplicity. Teachers can create an online environment where they can collaborate with their students and colleagues. Documents can be stored in Google Drive and can be easily edited there. Both teachers and students can use Google Docs, Sheets or Drive and connect them to Google Classroom directly. According to Okmawati 2020, what makes Google Classroom different from Google Drive experience is the teacher/student interface, which Google designed and developed for the way teachers and students think and work.

Target Audience

As designers we need to understand the relevant characteristics of our learners and how those characteristics provide either opportunities or constraints on our design (Morrison et al., 2010). The learners for this training program are CTIs/Interns, taking classes of BS Honors. They are all female teachers. They belong to different age groups. Their educational background varies as some are masters, some have done MPhil, and some are PhDs. They come from various

cities and have different cultural backgrounds. Most of the instruction will be in English. Sometimes the medium of instruction can be Urdu as it is the national language of Pakistan. My own experience of working with the CTIs and Interns in the administration tells me that they have great potential to face new challenges and if they get proper guidance and training, they can perform better in their classes. Specific entry characteristics of learners like skills, attitudes, or aptitudes and learners' style will be analyzed after the implementation of the program.

Contextual Analysis and Gaps

Contextual analysis provides information about environmental factors that will affect the design and delivery of the instruction (Morrison et al., 2010). The contextual analysis suggests that supervisors and administrators have a big role to play for this project. The supervisors and administrators include Principal and Vice principal of college, In-charge BS program, Coordinator BS program, SME and HOD of IT department. Supervisor involvement increases the likelihood that the employee will learn what is expected (Morrison et al., 2010). The supervisors and administrators mentioned above will be responsible for everything starting from selecting suitable dates and time, gathering, and entering data of participants and trainers, and staying in touch with the participants to check the progress of training.

To conduct this program successfully, it is very important to focus on the characteristics of the learning environment. Why should a designer be concerned with this larger environment? First, instruction and learning do not take place in a vacuum. The context influences every aspect of the learning experience. Second, context is a collection of factors that can inhibit or facilitate instruction and learning (Morrison et al., 2010). Both the learning environment and performance environment go hand in hand. They have their distinct importance, and both depend on each other to make a lesson productive.

The SME told me that nonstop power supply is of crucial importance so that the training sessions run smoothly and without wasting any one's time. Power failure can be a big gap that needs to be addressed. We will have to make a backup plan for that. We must make sure that the participants may attend the entire session without getting stuck because of electricity or any other hurdle. We must see that the classes are not meeting, and those participants are not engaged in classes when we conduct training. They must have working computers/laptops, tools and material required for training. The training course will consist of three sessions.

The causes of the existing problem are manifold. First, the CTIs and Interns we hire are mostly fresh Graduates and both interns and CTIs are untrained and inexperienced. Although we have some permanent teachers who utilize online learning tools but not as a routine. They are working well for their own subjects as they already got proper training before joining the service. Second, we have fewer permanent teachers and more classes to meet. For different subjects, we must rely on CTIs and Interns. Third, it is exceedingly difficult to hire a maximum number of CTIs every year as the Government does not allow the recruitment of more than one or two CTIs for a subject per year. As a result, we hire interns to facilitate students. Fourth, we have sufficient funds to conduct training and workshops for new teachers, but those funds and grants are not utilized properly.

The solution that comes to my mind is to address the primary problem and that is the inexperienced and untrained new CTIs and Interns. To design an efficient training and to solve a problem, it is very important to keep the characteristics of performance context in view. There are some evident performance problems in this context that need to be addressed. To answer the question of what to include, the instructional designer begins by identifying the performance problem and then uses a variety of tools to determine what knowledge and skills are needed to

solve the problem (Morrison et al., 2010). This training will focus on the interest level, attitude, regularity, sense of responsibility, and punctuality of the participants. Then their effective participation and motivation can fill the gaps that emerge because of insufficient technology literacy skills. To know about the participants' performance and learning, the SME will provide feedback through Google Docs. A post survey will be conducted to know how effective the training was or if it was effective at all. The attendance of the trainees will be taken. They will print their arrival and departure time on the attendance sheet. If they go out for short or long breaks during the training, that time will also be noted. A sample attendance sheet will be attached as (Appendix B).

Stakeholders

This research is an attempt to observe the effectiveness of a 'long-range' (Gagne et al., 1916) instructional plan for new hires to get trained before meeting their classrooms. The new hires are the major stakeholders. These teachers are a great source to perform various administrative duties assigned to them besides teaching. Other stakeholders in this research are the students and upcoming teachers who will benefit from this training. Parents come next who pay a huge amount in the form of fee and expect the best for their children. The college administration has its stake in this research and lastly, supervisors and administrators who will be helping in planning, analyzing, and executing this program.

Resources

The main resources that will help me design this project are Subject Matter Expert, BS In charge, and Coordinator of BS program. The textbooks of Gagne and Morrison are other resources that I will be using. Other than that, the articles I chose from Google Scholar and the

OU Library about the existing problems of education in Pakistan will also guide me in the design, development, implementation, and evaluation of this program.

Research Questions

Keeping in view the problems of the target audience, this project will be designed to answer the following research questions.

1. In what ways PBL helps teachers integrate technology in their online teaching?
2. In what ways can PBL help learners transfer their online literacy skills?

Research Methods

The research methods that will be utilized will be qualitative in nature. These methods include observations, surveys, interviews, recordings of training sessions, homework assignments, checklists and conversations with several groups belonging to this training design directly or indirectly. I preferred the qualitative method because the data collected will not be measurable in scales or numbers all the time. Pre-survey and online discussions have been conducted to know whether this training is a viable solution or not. The performance of the learners, the development of technology literacy skills and the effectiveness of the training will be monitored through observation reports by the instructor, online discussions during the training sessions, post survey and checklist. The problem of untrained teachers is gross because students' time is wasted, they do not have effective learning environments, their money is misspent, and the reputation of the college is in jeopardy. The data collected in the form of surveys/online discussions and empirical evidence from past research will be used to show that the problem is real and needs to be solved.

Scope

The scope of this project belongs to the new teachers at our college working in different departments and capacities and the teachers who will be joining our college in the future. The focus will be on the group that consists of CTIs/Interns who have never used Google Classroom before. For them, it will be a challenging scenario. This training intervention will familiarize them with the online learning tools especially those who have never used it before. This training will enable them to use these tools effectively, solve the authentic problems by finding effective solutions, and to transfer their newly learned knowledge and skills to the upcoming teaching staff members. Through this research, the college management will be able to conduct such training to meet various needs that may emerge in various contexts. This training does not include many participants and they belong to the same city. The results would be different if this training were implemented in a different context and if it was for more participants. Teachers coming from different cities and with different cultural and educational backgrounds can also benefit from this training in the future.

Contributions

This training will be designed for the Pakistani education system where the use of technology literacy in an online Problem-based Learning Environment will be very helpful for the teachers to solve ill-structured real-world problems. When these teachers become able to use technology literacy and transfer their skills to other teachers, it will promote advanced teaching methodology in our education system. It can also set grounds to initiate a proper learning management tool whether for online or in-person learning. The post data collected through interviews, artifacts, and surveys will prove the importance of this training design. Some

evidence will be provided from the past research to prove the benefits of problem-based learning integrated with technology.

Design Implications

The participants' efficiency is very important to make this plan successful. Although they are mature people and expectations from them are high, their attitude and levels of motivation can vary. It will be a huge task to maintain their interest in the sessions. As I mentioned earlier that electricity shortage is a major problem in Pakistan so we can connect to those teachers through their mobiles. They can use their hotspots to connect with the desktops for a smooth workflow. Time management and selection of relevant material to teach can be another challenge. The purpose of this training is to acquaint the participants with sufficient knowledge. So, it will be important to deliver effective instruction, use effective tools, and implement effective strategies for this Problem-based Learning Environment. It will depend on the instructor how well she plans her lessons and how she can convey the necessary information to the participants keeping in view the time limit and days decided for training.

Findings

The findings reveal that the challenges related to policy and planning are poor induction of teachers, lack of resources in teacher training institutions, demotivation among teachers, and unequal distribution of skilled and productive teachers, dual training system and infrequent training (Siddiqui et al., 2021). There are numerous challenges that the Pakistani Education system is facing. The problem of untrained new teachers is one of them. Being an Assistant Professor and an administrative member of a renowned college, I have myself closely observed the ground realities. Through my personal experience and interactions with several colleagues both seniors and juniors, I have concluded that CTIs/Interns need to be trained before meeting

their classes both face to face or online. It does not matter what subject or at what level they are going to teach, what matters is the production of effective results and the satisfaction of stakeholders. To achieve that target, teacher training is one of the solutions. Ineffective teaching has resulted in the increase of dropped students or leaving the college. About the loopholes in the administrative system, Rashid & Mukhtar (2012) stated, teachers' absenteeism, poor professional training, sub-standard materials, and obsolete teaching methods act as the major contributing factors towards the low enrolment in schools. After having multiple conversations with the SME and the coordinator of the BS program, I have realized that CTIs/Interns are talented and have potential to do more. Their talents are not well utilized, and their capabilities remain unexplored because of the extra burden they carry in the form of different challenges from the course content, students and their massive number, administration, deadlines, lots of exams, professional conflicts, and extra classes. If we implement this program, we can help the new hires for unpredictable situations like COVID-19. This training will help them manage their learning environments well, they will have a common space to share with their students, colleagues, and supervisors, they will not fall prey to confusions or haphazardness, and lastly, they will learn new online literacy skills to solve their students' problems.

Task Analysis

Morrison et al. (2010) refer to task analysis as the collection of procedures for defining the content of an instructional unit. Through task analysis, the target skill will be identified, prerequisites and material to train will be discussed, skills to train will be determined and will be broken into components, tasks will be analyzed, intervention will be implemented, and progress of the learners will be monitored through various assessment methods.

This project aims to design a teacher training session for the CTIs/Interns (who are untrained and inexperienced) regarding Technology literacy skills in the context of COVID-19 pandemic. The purpose of this design is to familiarize the new teachers with online PBL, enable them to use Google Classroom for effective implementation of TPCK framework, and to see if they can transfer their newly learned skills and knowledge to the real-world settings. I will be using the TPCK framework to support a Problem-based Learning environment. This framework will help teachers design their pedagogical methods and content knowledge with the help of suitable technological tools. Through Problem-based learning theory, they will be able to encounter a problem, explore it, identify the problem, investigate the solutions, find effective solutions, implement the solutions, and review their performance without relying on anyone. One of the main characteristics of the PBL environment is that it makes the learners independent and promotes critical thinking skills in them. They use an authentic problem, find effective solutions individually, in peers or groups, and implement that solution in real-world settings.

Information Processing Analysis with the SME

After a couple of meetings with the SME, this design will focus on information processing analysis. Conducting an information-processing analysis is the first step in 'decomposing' or breaking down a goal into its constituent parts, identifying what the students need to learn to attain the goal (Smith & Ragan, 1999, p. 69). Through this analysis, learners will be able to complete various tasks. My SME helped me a lot in analyzing the tasks. She is an Assistant Professor in the IT department and has an experience of more than 20 years. We decided to apply Gagne's five domains to teach problem solving skills with integration of technology for better learning outcomes. These domains are verbal information/declarative knowledge, intellectual skills, cognitive strategies, attitudes, and psychomotor skills. Out of these

five, intellectual skills, cognitive skills, and affective domain (attitudes) will stay dominant for the development of Technology Literacy skills in a Problem-based Learning environment.

Goals/Objectives

Goals of an instructional design are the outcomes that an instructional designer wants to achieve whereas objectives are the actions and assessable stages to reach a goal. Once objectives are stated in performance terms, the curriculum can be analyzed in terms of sequence and completeness and the requirements of prerequisite skills (Gagne et al., 1916). To gain a proper direction and stay focused, the goals and objectives of this instructional design are as under.

Goal

Enabling teachers to develop Technology Literacy skills in a Problem-based Learning environment.

Objectives

New teachers will be able to

- encounter the problem
- explore the problem
- identify the problem
- define the problem
- investigate the solutions
- implement the solution
- integrate their newly learned knowledge and skills to real-world settings

Prerequisites

After talking to the SME, the following prerequisites should be kept in view to achieve the desired outcomes.

1. The consistency and commitment of the trainers, participants, and the supervisors is required.
2. Background knowledge of online learning management will be helpful
3. A copy of the training material will be shared with the SME
4. Time management will be of central importance
5. Working laptops or desktops, Non-stop power supply and availability of Wi-Fi will be ensured to run the training sessions without any interruption.
7. The material like notepads, pens, headphones will be required from the participants
8. There should not be any external noise during the sessions.
9. The participants must keep water bottles with them. They will be allowed some short breaks once they feel the need for them

Steps

This training consists of 4 modules and tasks will be analyzed according to these modules. These modules follow Merrill's First Principles to make the instructions effective

Module 1

- New teachers will start their computers.
- They will check if the internet is connected.
- They will click on their browsers (Google Chrome is used there).
- They will sign into their Gmail accounts (All of them have Gmail accounts).
- They will open their inboxes.
- They will find the email sent by me for the Zoom link.
- They will click on the link to connect to Zoom.
- They will enter their passwords to join the Zoom meeting.

- They will accept the invite for Google Classroom from the instructor from their Gmail accounts.
- They will click Classwork
- They will click Problem Scenario Part 1
- They will read it and will write down the key points
- They will click Learners' Space 1 and will answer the questions on the space provided for each teacher
- The learners will interact with the instructor and with each other through an open discussion
- The learners will click the link for Learners' Space 2 and will write the main points
- They will discuss the content of Problem Scenario Part 1 with the instructor and will suggest solutions according to their understanding and background knowledge
- Learners will receive feedback after this activity

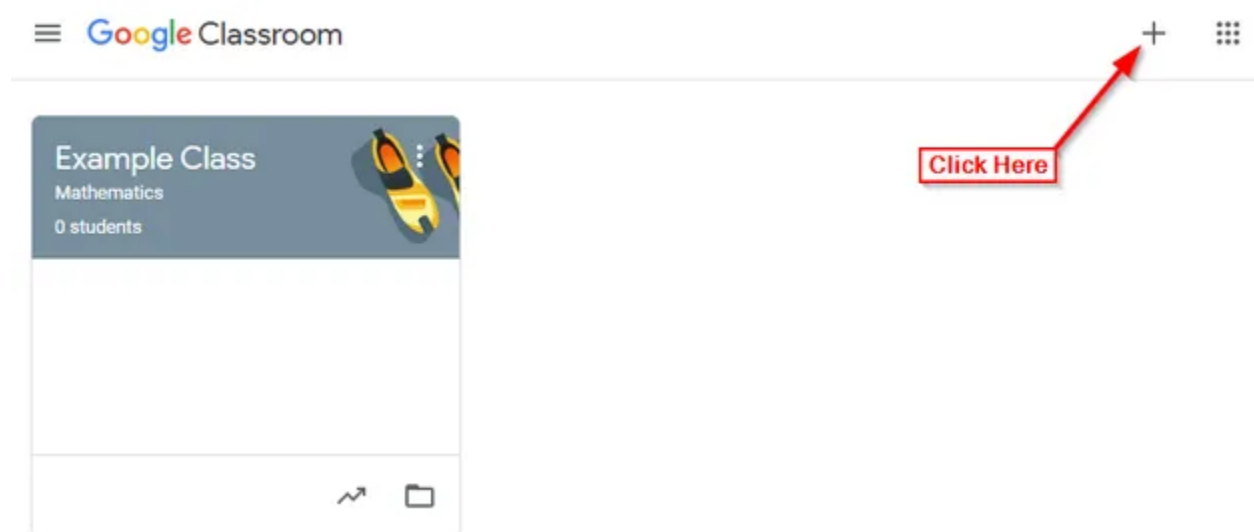
Module 2

- Learners will divide themselves in groups
- Learners will explore different resources of their own choice to know more about the problem
- The learners will click the link to several PDFs related to LMS shared through the chat box in Zoom
- They will read any article and will note down the important points
- They will relate the knowledge they gained from these articles and the resources that they consulted independently
- They will engage in an open discussion with the peers and the instructor

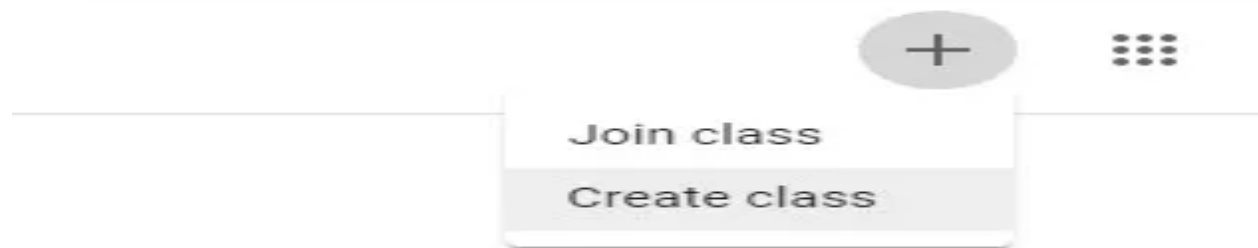
- They will receive feedback
- Learners will think about different possible solutions of the given problem
- They will receive feedback
- They will read the remaining part of the problem scenario by clicking the link from the chat box in Zoom shared by the instructor
- They will compare the solution given in this part with the solutions that they thought about
- They will participate in an open discussion

Module 3

- Learners will work in the same groups
- They will register as teachers
- They will go to <https://classroom.google.com/> and sign in
- They will click the +icon on the top right corner



- They will select Create Class



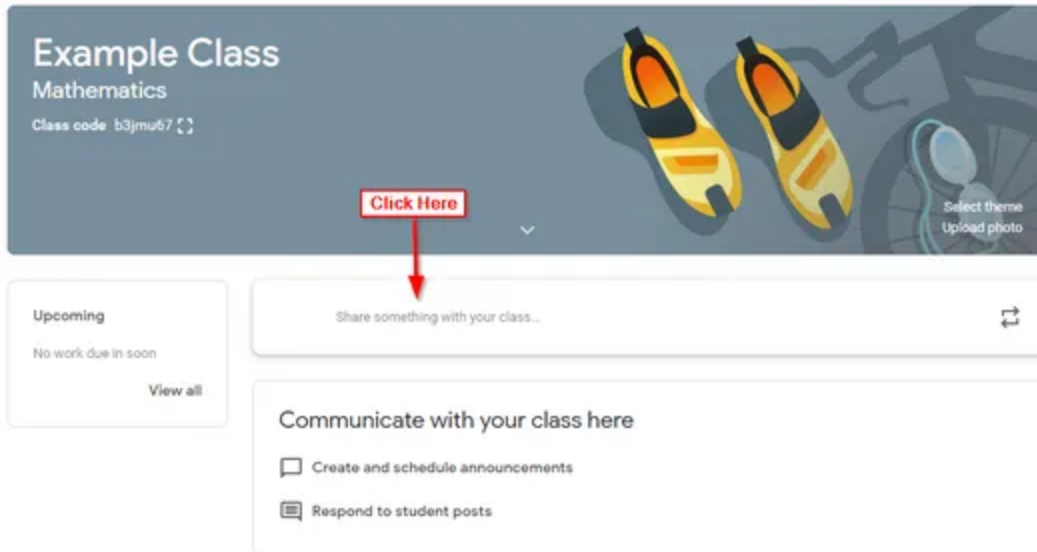
- They will fill in the class details and will click Create

Create class

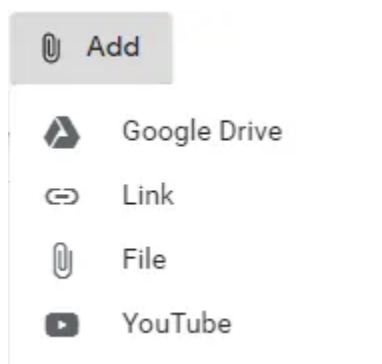
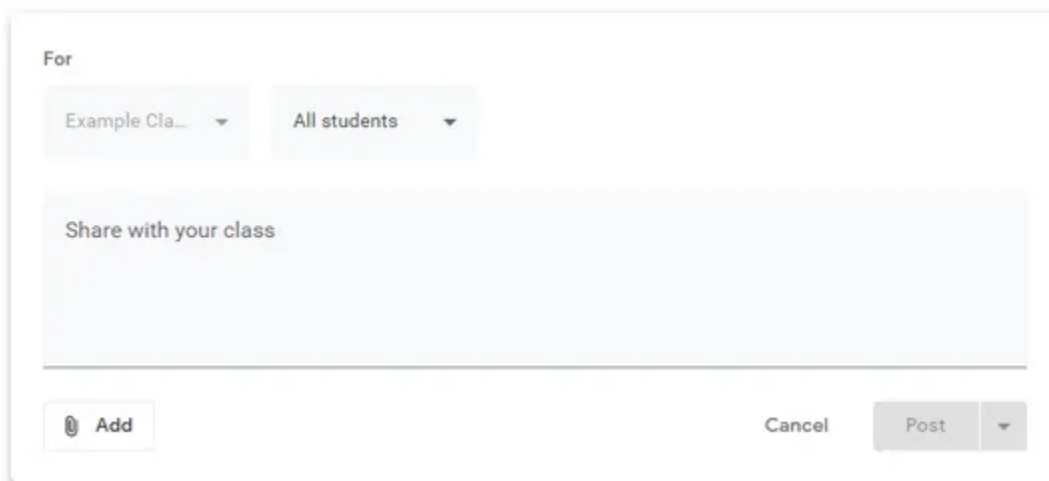
| | |
|-----------------------|------------------|
| Class name (required) | Example Class |
| Section | Computer Science |
| Subject | Programming |
| Room | Buidling 1 - 201 |

Cancel Create

- Learners will name the class. They will add a section and room also if required
- Learners will click the Stream option and will be able to see the class details and how it looks



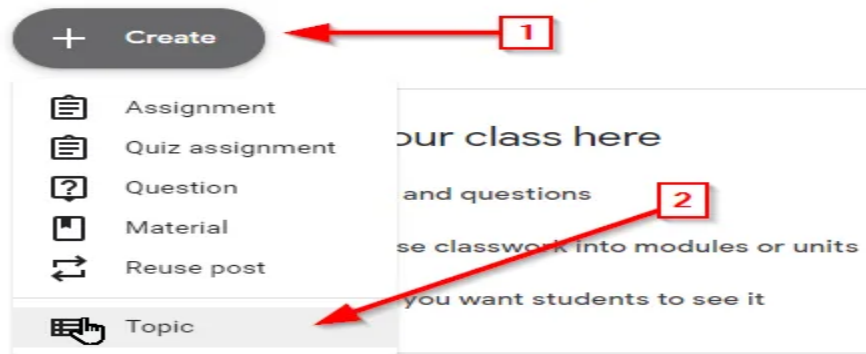
- They will practice making an announcement via Stream like a Welcome Note, a Reminder, or a Notice
- They will practice adding the attachments to the announcements by clicking Add button



- They will go to Classwork



They will click Create



- They will create an assignment
- They will choose the title for the assignment
- They will add instructions
- They will practice attaching a Google Drive, Google Docs, Google Forms, YouTube or web link with the instructions
- They will also practice adding an image or document from their computers related to their subjects
- They will explore the options of Quiz assignment, Question, Material, and Reuse post
- They will add points or make rubrics for grading, and they will select date for submission



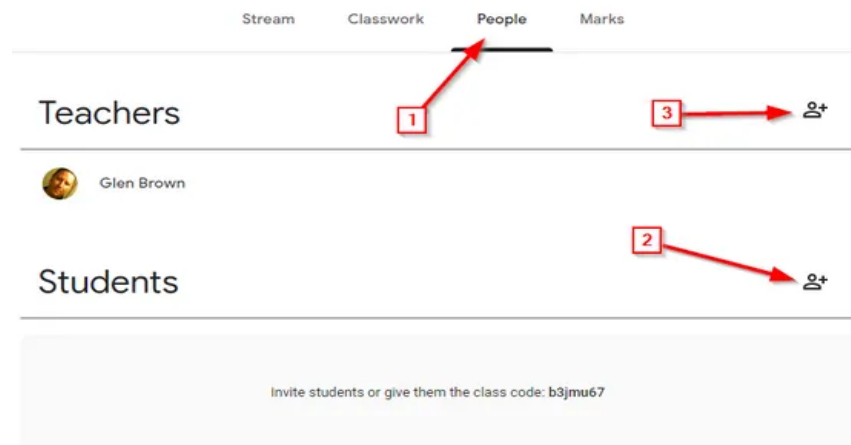
- They will assign the assignment
- Learners will invite students (peers for practice)
- They will use the code or email addresses to invite students

Invitation via Code



Invitation via Email

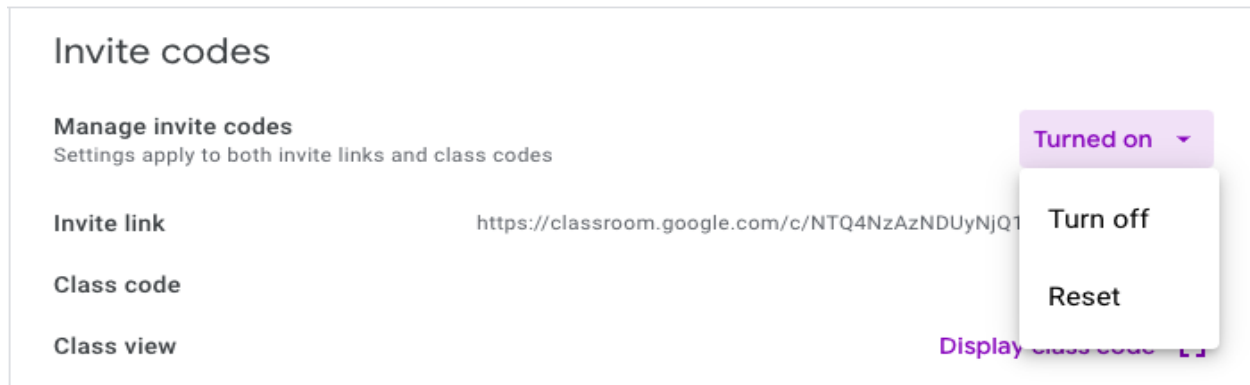
- Learners will click People
- They will click the Add button in the students' section
- They will type the name or email address of the students and will send them the invite



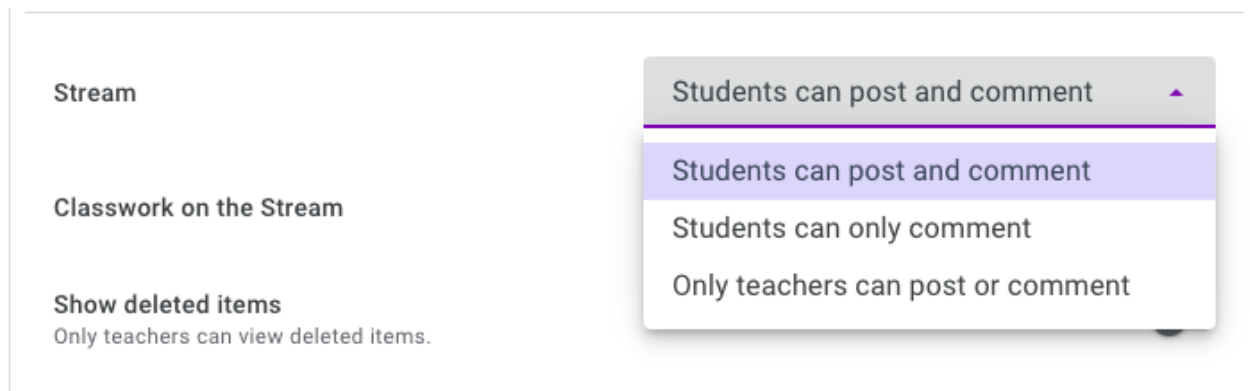
The 'Invite students' dialog box has a title 'Invite students' and a text input field with the placeholder 'Type a name or email address'. At the bottom right, there are two buttons: 'Cancel' and 'Invite'.

- Learners will click on Settings
- They will add or remove details in the Class like Section, name, description, or room
- They will see if they need to change the general settings about the codes

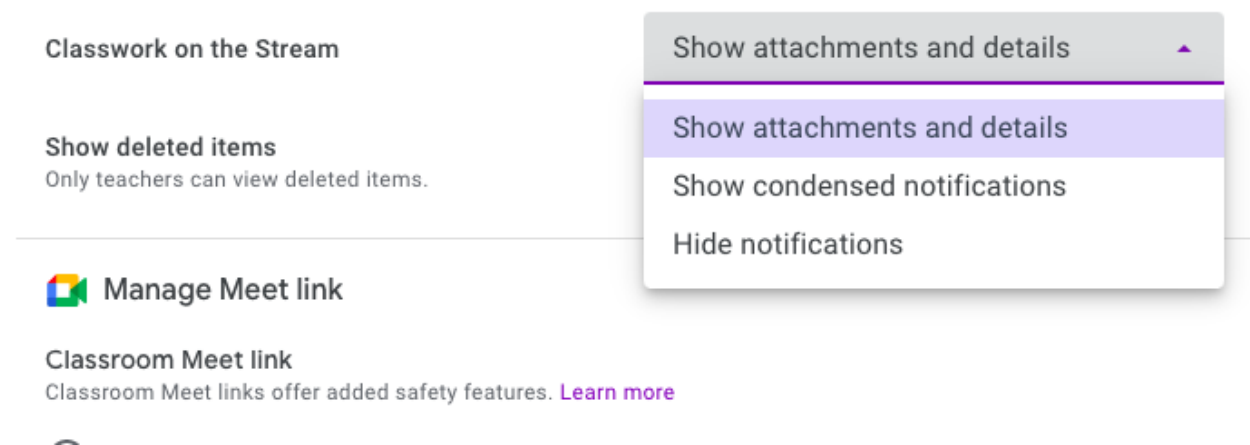
- They will explore Manage Invite Codes and choose the option from the drop-down menu



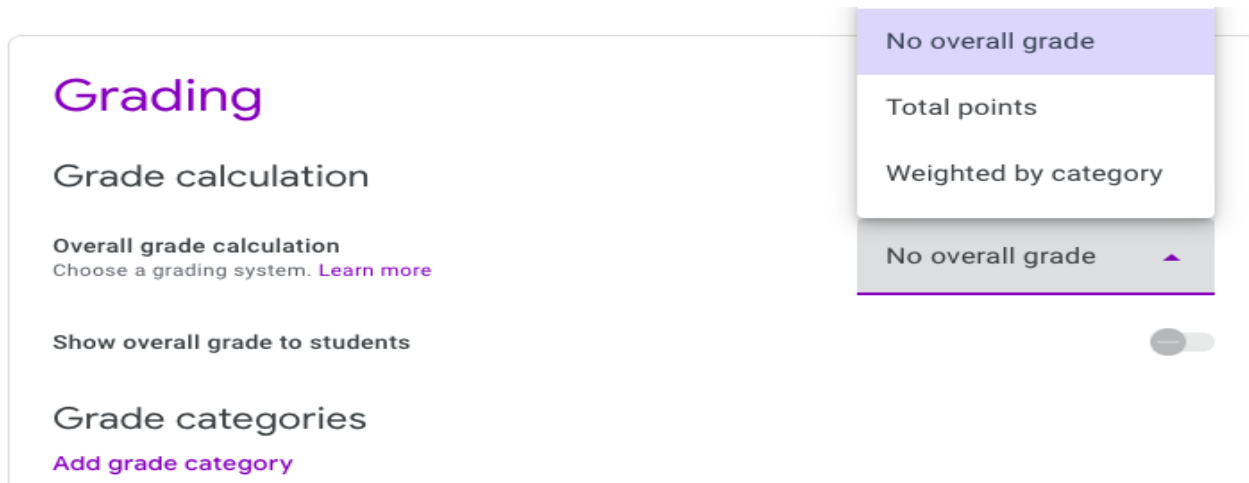
- Learners will explore the Stream options



- They will click on Classwork on the Stream and will explore the choices from the drop-down menu



- They will explore the option of Classroom Meet. In order to use Classroom Meet, they will need permission from the Admin
- They will click on Overall grade calculation and will explore from the drop-down menu and will scroll the little bar for showing overall grade to students or not.



- Learners will take part in open discussion and will receive feedback from the instructor

Module 4

- Learners will look at the PowerPoint presentation of the instructor
- Learners will discuss about LMS and PBL and their overall experience with the instructor
- Learners will click the assignment named Post Interview in Google Classroom and will complete it (Individual Task)
- Learners will receive instructions about the Homework they are supposed to do
- Learners will click Problem Scenario for Homework in Google Classroom
- They will read the instructions and will ask questions about their confusions and requirements of the assignment
- Learners will click on Checklist from Google Classroom and complete it for self-assessment

- Learners will click Post Survey from Google Classroom and will complete it

Conclusion

“The Education sector in Pakistan suffers from insufficient financial input, low levels of efficiency for implementation of programs, and poor quality of management, monitoring, supervision and teaching” (Memon, 2007). The problem that exists in our college in the form of untrained teachers is a massive problem. The poor quality of teaching, insufficient funding, and ineffective policy making have been experienced at our college for many years. We rely much on the CTIs and Interns due to a smaller number of permanent teachers. Unfortunately, these CTIs and Interns have never been trained since the BS system started at our college. We have a massive number of students in all disciplines. As far as other disciplines are concerned, they do not face such troubles as the IT department does (It has only two permanent teachers). The only solution we can foresee or find out is to conduct an efficient training program for our new hires so that they may not feel confused or discouraged in their classrooms. Through this program, they will have proper directions, their technology literacy skills will increase, and this training will help them solve the problems of online learning management systems. “It is evident that without teachers’ transformation we cannot transform the education system for improving the quality of education” (Memon, 2007)

Instructional Plan

For better delivery and outcome of the instructional plan, I shall be using Merrill's First principles to follow a strategic pattern in making this instruction effective.

First Principles of Merrill

The main steps of Merrill's first principles are as under

1. Problem Centric Task
2. Prior knowledge of the learners is activated.
2. New knowledge is demonstrated to the learners.
3. Learners apply the newly gained knowledge.
4. Learners integrate that knowledge into their surroundings

Sequencing in Instruction

Sequencing is the efficient ordering of content in such a way as to help the learner achieve the objectives (Morrison et al., 2010). After setting the objectives in task analysis with the help of SME, I felt the need to arrange the instructional plan in a sequence. Task analysis provided me with a direction about how to present the content of the instructions. Morrison et al. (2010) describe the importance of sequencing keeping in view the objectives. According to them, for the task of changing a tire, the sequence is developed through a proper procedure and for other topics like writing a research paper, the sequence will be less obvious. Different instructors will adopt different approaches to write a research paper. One may start with how to read a research paper, and another may start with teaching how to use the library. There are several general methods to arrange a content in sequence. One well-known method is the prerequisite method (Gagne, 1985), which is based on a learning hierarchy that identifies skills that are dependent on other skills. Prerequisite skills are taught first (e.g., how to sort checks before

making them as cleared). A second approach described by Posner and Strike (1976), is a set of strategies for sequencing the instruction based on learning-related, world-related, and concept-related content.

Keeping in view the objectives of this instructional plan, I talked to the SME about selecting a suitable sequencing method so that we can facilitate both the instructors and the learners. Our aim is to develop online literacy skills in new teachers. Our past experiences suggest that lack of training sessions was the cause of teachers' problems. Through this instructional plan, we shall be working on this problem. With the help of the SME, I decided to follow a sequencing pattern that can best suit this instructional plan. We assume that sequencing will be a helpful tool to develop the skills of learners for better development of online Literacy skills. There are several sequencing methods (Morrison et al. and Gagne's books can be consulted in this regard) that can be adopted to plan this instruction, but we thought of choosing learning-related sequencing as we considered it suitable for this instructional plan.

Learning-related Sequencing

The learning-related sequencing suggests the ways of sequencing the content based on learner characteristics identified in the learner analysis (Morrison et al., 2010). Learning related sequencing is divided into five main steps. First, there are identifiable prerequisites a learner must master before demonstrating a more complex task. Second, the instructor should teach about the familiar or known before teaching about the unknown. Third learning related scheme is difficult. Fourth is the sequencing of content based on interest. Fifth, the content is sequenced according to a development theory (Morrison et al., 2010).

Rationale

Sequencing is helpful to follow a routine in instruction. Through sequencing, an instructor can conduct different activities and make learners execute their skills for various learning tasks. Keeping in view the current project, I have selected a learning-related sequencing method. I chose this sequence because of the five steps it contains. For the first step, prerequisites should be determined. We identified several prerequisites like the efficiency and motivation of learners is required to complete the desired tasks. Second, the existing knowledge about the task should be tested by the instructors. Third, the difficulty level of the learners will be focused. This stage involves the cognitive development of the learners. They will use their cognitive abilities to achieve their goals. Fourth, the content of the lesson should be sequenced based on the interest of the learners. For this purpose, such activities should be introduced that learners find more interesting and are more eager to perform. In this way, they will feel motivated to perform well. Fifth step is to incorporate a developmental theory in the instruction. Piaget's cognitive development theory and Kohlberg's moral development theory can be extremely helpful to make an instructional plan successful. Through these theories, the learners will be morally encouraged, and they will be using their cognitive abilities effectively. Keeping in view all the five steps of learning-related sequencing, we preferred using it in this instructional plan.

Problem-based Learning Environment

The overarching goal of this training intervention was to enable CTIs/Interns to learn online literacy skills through Problem-based Learning environment. PBL is an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined

problem (Savery, 2015). After some research, Merrill's First Principles seemed to be an accurate model to design this problem-based learning environment. Merrill's First Principles describe the fundamental principles of effective instruction and provide a unifying view of different instructional perspectives (Frick et al., 2011). As a design heuristic it was intended to be used in conjunction with any learning theory to create good instruction (Cropper & Bentley, 2006).

First principles of instruction are design oriented or prescriptive rather than learning oriented or descriptive. They relate to creating learning environments and products rather than describing how learners acquire knowledge and skill from these environments or products (Merrill, 2002). Although First Principles are more instructor-centered and PBL is more learner-centered, when brought together, they emerge as an effective product to facilitate both the instructors and the learners. Merrill's First Principles of Instruction provide a set of 5 interconnected principles that are compatible with Problem-based learning. These principles include Problem-centric task, Activation, Demonstration, Application, and Integration. By using these principles, challenging and problem-based environments are constituted which enforce learners to be more critical, creative, and encourage them to think more and in different ways that all help to raise the creativity (Jalilehvand, 2016). For this online PBL design, 4 key aspects of pedagogy described by Ge & Huang (2022) were considered mainly. These aspects are preparation and planning, design and development, Implementation and facilitation, and assessment. Problem-based learning is an educational approach whereby the problem is the starting point of the learning process (Graaff & Kolmos, 2003). The training was divided into 4 modules by following Merrill's First Principles of Instruction starting from Problem-Centered Task. In the Activation phase, the learners were given a hypothetical problem that they encountered in the beginning. Keeping in view that problem, the learners identified and defined

the problem. Demonstration step included researching the problem and finding the solutions. For the Implementation part, the learners implemented the solutions and Integration let the learners practice PBL as a homework assignment.

The learners practiced all seven steps of PBL through different learning activities designed for them. These activities were designed and presented with the support of Google Classroom's Learning Management System and Zoom. Like other learning environments, technology plays a vital role to enhance innovative teaching and learning skills in Problem-based learning environments also. To solve the traditional PBL difficulties, we need support from technology as the students in this era are actively using the technology (Hussin et al., 2018). Problem-based learning as a student-centered approach develops learners' critical thinking, higher order thinking, self-directed learning, collaborative learning, researching, inquiry-based learning, cognitive and metacognitive skills. The role of the instructor is more of a facilitator to scaffold the activities in the problem-solving process. For all activities, proper instructions and timely feedback were provided to keep learners at ease and be motivated. The successful guidance of PBL is largely dependent on the availability and skills of instructors who can scaffold students' problem-solving activities with strategies such as providing hints and cues, asking questions to direct students' attention, eliciting their causal explanations, and elaborating their thinking (Brown, Collins, & Duguid, 1989).

Sequencing of Modules

| Steps | Time |
|---------------------------------------|-------------------|
| Learners encounter the problem | 25 minutes |
| Learners explore the problem | |

| | |
|---|-------------------|
| Learners identify and define the problem | 20 minutes |
| Learners research about the problem | 25 minutes |
| Learners investigate the problem | 20 minutes |
| Learners implement a solution | 1 Hour |
| Learners integrate their knowledge and skills to the practical world | 40 minutes |

Overall Structure

| PBL | TPCK |
|--|--|
| <p>Encounter the problem (Scaffolding resource, Problem Scenario)</p> <p>Explore the problem (Connections with background knowledge and real-world situations. Discussion questions. Brainstorming, reflections, Cognitive, metacognitive skills)</p> <p>Identify and Define the Problem (Self-directed Learning, Group work, collaboration, communication, skills, conceptual scaffolding)</p> | <p>TPCK Framework has been used to design this plan. Technology is incorporated to design various pedagogical methods and content knowledge.</p> |

| | |
|---|--|
| <p>Research about the Problem (Web search, group work, skills)</p> <p>Investigate Solutions (Problem scenario: part 2) Suggesting solutions, practicing Google Classroom, Skills, Motivation, Independent learning)</p> <p>Implementation (Peer work, procedural scaffolding)</p> <p>Integration (transfer of skills)</p> | |
|---|--|

Module 1: Problem-Centric Task and Activation

Instructor briefly discussed the purpose of this training before starting the intervention.

Theoretical Support: “Instruction should activate relevant cognitive structures in learners by having them recall, describe, or demonstrate relevant prior knowledge or experience. Instruction should have learners share previous experiences with each other. Instruction should have learners recall or acquire a structure for organizing new knowledge (Merrill, 2009).

Part 1: Meet and Explore the Problem (PBL)

Objectives: Learners encounter the problem

Learners explore the problem

Learners make connections with their background knowledge

Time: 25 Minutes

Steps:

1. Problem presented by the instructor

[Problem Scenario \(Part 1\)](#)

By encountering this problem, the learners may come to know that delivering the content only is not enough. And like Annie, if they do not know how to manage their online classes, they will also face the same problems as she did. This problem will give them an insight into their own experiences where they encountered such difficulties.

The instructor wants the learners to provide such solutions that may help them keep their content material, pedagogical methods, and technological intervention synchronized at a single platform. The solutions learners may provide should be sorted out to avoid haphazardness in delivering technology-oriented content.

2. The instructor asks the learners to write down the key points (Direct Instruction)
3. Learners read the scenario and answer the questions on a Doc sheet prepared by the instructor for everyone (Individual Task). The name of the prepared sheet is '[Learners' Space 1](#)'.

Brainstorming incites open and continuing partnership to solve problems and generate new ideas. Through brainstorming learners can generate many ideas within less time, which can be polished and combined to create an ideal solution. The use of brainstorming instructions is essential to the production of many good ideas (Rossiter & Lilien, 1994).

4. The instructor will conduct an open discussion based on the answers of the learners.

“It is important that teachers' questions should not be viewed as an end in themselves. They are a means to an end—producing desired changes in student behavior” (Gall, 1970).

Material: Writing pads, pens,

Tools: Zoom, Google Docs

Resources: Problem Scenario Document

Skills and Scaffolding

Technological Skills: The instructor will guide the learners to use technology for problem solving. Reading the problem scenario from Google Docs is an authentic example. The instructor will help them click on the link provided for the problem. They will be scaffolded to reach the document.

Pedagogical Skills: Brainstorming by engaging the learners in collaborative discussion and helping them develop independent learning will be a feasible pedagogical method. This approach will also develop their cognitive, critical thinking and communicative skills.

Content-Concept: Instructor asks questions about the scenario and engages students in a brainstorming activity through open discussion. The specific concepts to be scaffolded would be based on the understanding of the problem based on the problem scenario.

Part 2: Define the Problem (PBL)

Objectives: Learners identify the problem

Learners define the problem

Time: 20 Minutes

Steps:

1. Instructor presents questions about identification of the problem through a Google Docs sheet already prepared. The name of the sheet is '[Learners' Space 2](#)'.
2. Learners answer those questions in their assigned spaces on the sheet.
3. After they complete the activity, the instructor engages learners in a brainstorming activity through open-ended collaborative discussion.

(Flexibility in instruction, Facilitating the learners by appreciating each response)
4. Learners come with their own ideas of what the problem is. (Autonomy increases motivation and self-regulated learning)
5. Instructor gives feedback

“Feedback is most valuable when students have the opportunity to use it to revise their thinking as they are working on a unit or project” (Bransford et al., 2000)

Material: Writing Pads, Pens (Personal Use)

Tools: Zoom, Google Docs

Task: Individual

Skills and Scaffolding

Technological Skills: By now, the learners will be able to reach the document themselves. Still, if they find any problem, the instructor will help them open the link provided for the questions. They will be scaffolded to reach the document and perform the activity.

Pedagogical Skills: Brainstorming by engaging the learners in collaborative discussion and helping them develop independent learning will be a suitable pedagogical method. This approach will also develop their cognitive, critical thinking and communicative skills.

Content-Concept: The specific concept to be scaffolded would be based on the identification of the problem.

Module 2: Demonstration

Rationale: According to Merrill (2009), the demonstration principles are as under.

1. Instruction should provide a demonstration of the skill consistent with the type of component skill: kinds-of, how-to, and what-happens.
2. Instruction should provide guidance that relates the demonstration to generalities.
3. Instruction should engage learners in peer discussion and peer demonstration.
4. Instruction should allow learners to observe the demonstration through media that are appropriate to the content.

Part 1: Research the Knowledge (PBL)

| |
|---|
| Objective: Learners will research about the problem |
| Time: 25 Minutes |
| (Collaboration, Self-directed Learning and Motivation) |
| Steps: <ol style="list-style-type: none"> 1. Instructor asks learners to divide themselves in groups (3 members in each group) 2. Learners use different web resources of their own choice to research about the problem (Self-directed Learning) 3. (Demonstration of the Activity) The instructor will share her Google Drive with the learners and will ask them to choose any article, read it, pen down the main points, and discuss them with each other <p>LMS</p> |

Steps:

1. Instructor asks learners to divide themselves in groups (3 members in each group)
2. Learners use different web resources of their own choice to research about the problem (Self-directed Learning)
3. (Demonstration of the Activity) The instructor will share her Google Drive with the learners and will ask them to choose any article, read it, pen down the main points, and discuss them with each other

[LMS](#)

4. Instructor conducts discussion after the learners have completed their tasks
(Brainstorming)
5. Learners share their research resources, why they chose them, what results did they derive and how the articles have developed their understanding of the problem (if they helped them at all)
6. Instructor gives feedback

Material: Writing pads and pens,

Resources: PDFs

Tools: Zoom, Google Drive, Google Scholar

Activity: Group Work

Skills and Scaffolding:

Technological Skills: By now, the learners will be able to reach the document themselves. Still, if they find any problem, the instructor will help them open the link provided for the articles. They will be scaffolded to reach the document and perform the activity.

Pedagogical Skills: Brainstorming by engaging the learners in collaborative discussion and helping them develop independent learning will be a suitable pedagogical method. This approach will also develop their cognitive, critical thinking and communicative skills.

Content-Concept: The specific concept to be scaffolded would be based on the exploration of the problem.

Part 2: Investigate the Solutions (PBL)

Objective: Learners will investigate the solutions

Time: 20 Minutes

Demonstration of Instruction, Students Collaboration, Self-directed Learning and

Motivation

Steps:

1. Instructor asks learners to think about a solution, write down the possible solutions and discuss them openly (Individual Task)
2. Instructor gives feedback
3. Instructor shares the remaining part of the problem scenario in which Head of the Girls branch had proposed a solution to Annie

[Problem Scenario \(Part 2\) \(Continued from Part 1\)](#)

4. Instructor asks the learners to read the remaining part, discuss it in group, and compare it with the solutions that the learners had thought of
5. The instructor engages the learners in discussion

Material: Writing pad and pen,

Tool: Zoom, Google Docs

Activity: Group Work

Resources: Problem Scenario (Part 2) Document

Skills and Scaffolding:

Technological Skills: By now, the learners will be able to reach the document themselves.

Still, if they find any problem, the instructor will help them open the link provided for the problem scenario part 2. They will be scaffolded to reach the document and perform the activity.

Pedagogical Skills: Brainstorming by engaging the learners in collaborative discussion and helping them develop independent learning will be a suitable pedagogical method. This approach will also develop their cognitive, critical thinking, problem solving and communicative skills.

Content-Concept: The specific concept to be scaffolded would be based on the investigation of the problem.

Module 3: Applying

According to Merrill (2009), the demonstration principles are as under.

1. Instruction should provide a demonstration of the skill consistent with the type of component skill: kinds-of, how-to, and what-happens.
2. Instruction should provide guidance that relates the demonstration to generalities.
3. Instruction should engage learners in peer discussion and peer demonstration.
4. Instruction should allow learners to observe the demonstration through media that are appropriate to the content.

Present and Support the Possible Solutions (PBL)

Objective: Learners will implement the solution

Time: 1 Hour

(Demonstration of the Activity and Implementation of the Solutions)

Steps

1. Instructor proposes a hands-on Peer Work activity to design an online classroom based on the solution provided by the head in the problem scenario
2. The instructor asks the learners to role play. As an example, they create a Google Classroom and navigate through different options there. (Learners can create their own learning management system also. Google Classroom is chosen for a collaborative task)

“Basically, role playing calls for a student's stepping outside the accustomed role that he plays in life, relinquishing his usual patterns of behavior in exchange for the role and patterns of another person” (Chesler & Fox, 1966).

3. Before they start role playing individually, the instructor shares a [YouTube Tutorial Video](#) with them to learn the steps.

Learners can pause and play the video whenever it is required for better learning

6. (Self-directed Learning) Learners perform the activity (The instructor creates her own Google Classroom to be on the same page with the learners and to assist them during the procedure) (Procedural Scaffolding)
7. Open Discussion and Feedback (Learners share their experience and describe whether Google Classroom can be an effective tool to solve Annie’s problem or not)

Material: Writing Pads and pens, Headphones for YouTube Video

Resources: YouTube Video

Tools: Zoom, Google Classroom

Activity: Peer Work

Skills and Scaffolding

Technological Skills: The learners will be directed to click the YouTube link themselves.

Still, if they find any problem, the instructor will help them open the link provided for the Google Classroom tutorial. The instructor will create a classroom herself for procedural scaffolding.

Pedagogical Skills: Role playing will help the learners adopt a different strategy for their own classrooms where they can let their students implement the solutions in their own way.

This hands-on activity will help them go deep into the problem, find a solution, and implement it in a practical way. Giving learners the autonomy to work on a task is an effective method. This approach will also develop their cognitive, critical thinking, problem solving and communicative skills.

Content-Concept: The specific concept to be scaffolded would be based on the implementation of the solution.

Module 4: Integration

Rationale: According to Merrill, (2009) the integration principle

1. should integrate new knowledge into learners' cognitive structures by having them reflect on, discuss, or defend new knowledge or skills.
2. should engage learners in peer critique.
3. should have learners create, invent, or explore personal ways to use their new knowledge or skill.
4. should have learners publicly demonstrate their new knowledge or skill.

Review Performance (PBL)

Objective: Learners integrate their newly learned knowledge and skills to real-world settings

Time: 40 Minutes

Transfer of Skills, Self-directed Learning and Motivation, Demonstration of the Content Knowledge, and the Tasks

Steps:

1. The instructor demonstrates the importance of LMS through [PowerPoint presentation](#)
2. Discussion with the learners about their overall experience of this training session and what they have learned through it. The instructor will ask the learners to answer some questions related to LMS and online PBL. The interview questions are prepared on Google Forms. The learners will complete it after the training and submit it through Google Classroom. (Individual Task)

[Interview](#)

3. Assigns tasks to the learners. The instructor will provide a hypothetical problem to the learners. (Group Work) They will be asked to find a solution by following all 7 steps of Problem-based learning. They will provide rationale why this solution will be effective. They can use any tool for this assignment and submit responses to the instructor. The instructor will give her feedback to assignments and will post the individual responses through Google Docs to Google Classroom. This feedback will also analyze the overall performance of everyone)

[Problem Scenario for Homework](#)

4. Instructor asks the learners to complete checklist for self-assessment and give their feedback about this training through a survey

[Checklist](#)

[Survey](#)

Resources: Google Scholar, SME

Material: Writing pads, Pens (Personal use)

Tools: Zoom, Google Classroom, Google Forms, Google Docs, Microsoft PowerPoint

Activity: Individual Task, Group Work (For homework)

Skills and Scaffolding

Technological Skills: The instructor will demonstrate the importance of LMS through Microsoft PowerPoint. The learners will be directed to reach the required sheet for the interview questions prepared on Google Forms. They will also be scaffolded to respond and submit the responses in Google Classroom.

Pedagogical Skills: By demonstrating the importance of LMS, the instructor will scaffold the content knowledge with technology. The instructor will scaffold different tasks by guiding the learners about the steps, responses, and submission procedures. These steps will help learners adopt the same strategies for their classrooms.

Content-Concept: Specific concept to be scaffolded would be based on the integration of the solution.

Assessment and Evaluation

The term *evaluating* refers to the process of using measurement or assessment to make judgements about something. The terms *measuring* and *assessing* are used interchangeably to denote the systematic collection of data about programs or people (Morrison et. al, 2010).

Online meetings with the SME and two CTIs, and pre-survey conducted with 11 students helped recognize the need for this intervention. The question prompts used via both Learners' Space

sheets, overall discussions, training recordings, post-interview, and homework assignments will be used to assess the performance of the learners. The SME will provide feedback for homework assignments and individual feedback will also be given via Google Docs. This feedback will also help in the evaluation of the learners' performance. The assessment will be made based on the understanding, motivation, navigation skills, overall attitude, and interactive skills. A Line Chart will be used to evaluate the performance of the learners in the above-mentioned categories. The checklist will be used for self-assessment of the learners and post-survey will help in the evaluation of the training.

Implementation and Data Collection

Pre-Implementation Data

1. Online Meeting with two existing CTIs
2. Online meeting with the SME
3. Survey conducted with 11 students. One from each discipline

Online Meeting with two existing CTIs

Analysis and Reflection

From the online meeting with the two existing CTIs, it is evident that they have difficulties in managing their online classes because they have no common platform and they have never been trained for online literacy skills. This interview will help me in my next iteration as well.

Online Meeting with the SME

Analysis and Reflection

After the meeting with CTIs, I had an online conversation with the HOD of the IT department who helped me in designing this training session. She also revealed some facts

through her observation report. She also approved the fact that training was a requirement for the new teachers. The new thing I learned through this conversation is that these teachers are eager to learn about online classroom management and they have a great potential. They have experience using different technological tools, but they did not get a chance to use them for classroom purposes. This training can help them build a strong and smooth relationship with their students that is very important for effective classroom management. The new teachers' willingness and active participation in the training session will help me implement the design in a better way.

Survey Conducted with 11 Students: One from each discipline

Identity of the students is not revealed. I just categorized them as Student 1, Student 2 and so on. The short form will be used in columns as S1, S2, S3. Please click the hyperlink below to see the responses of the students.

[Survey results](#)

Analysis and Reflection

11 students participated in this survey from all 11 disciplines of the college. They were randomly selected. For part one of the Survey, there were Yes, and No questions and they were 10 in number. Second part consisted of multiple-choice questions. These were 10 in number and choices given were satisfactory, unsatisfactory, good, not so good. Last part was about short questions. The responses from the first part indicate that most of the students had answered in No instead of Yes. From this part, responses from Student 2, 3 and 4 indicated that they had a little better experience with their teachers, but it was not so good. All the students had answered in No when they were asked whether they were satisfied with their new teachers or not. Majority of the students' responses were in No when they were asked about teachers completing their lessons in

time, answering students' questions in time, incorporating activities like peer and group work in their instructions, students' easy access to the weekly assignments, teachers' methods of online teaching, teachers giving productive feedback to students, teachers taking extra classes of students, and teachers integrating technological tools in their instructions efficiently. Failure of teachers in managing their classes online is a big problem. When students were asked if teachers took extra classes of students, repeated concepts if students did not get them for the first time, and about the flexibility in due dates, the responses in Yes increased. It might be because teachers themselves know that students are having trouble in their classes and that's why they take extra classes to finish their courses which they are unable to do in the regular classes. It is an extra burden on both the teachers and students because more attention is being paid on completion of the courses rather than producing effective instructions and solving problems of students.

For the second part of the survey, most responses indicated that teachers' performance was unsatisfactory or not so good in all the areas required for better instruction. For question 3 that was about the incorporation of effective activities in the instruction, all students marked unsatisfactory boxes except one student who responded by marking Not so good box. Students 2, 3, and 4 marked good for some questions like better motivational skills, time management skills, and collaborative skills. It showed that teachers taking classes of Students 2, 3, and 4 were performing better as compared to other teachers. Still there was not even a single response of any student for any question that was in the 'satisfactory' box. It shows that some teachers have some better skills that are somehow good for the students which gives a little hope. Through these questions, I got the direction for which areas should be focused more for better implementation of the plan.

For the third part of the survey, short questions were included. Questions asked and analysis of students' responses is given below.

Q1. What changes do you want to see in the instructional methods of the teachers especially in this pandemic?

Teachers should work on their communication skills, motivational skills, incorporating interactive and engaging discussions in classrooms, creating well planned lessons, variety in delivering instruction, creating a common platform for learning, giving feedback to students, and selecting the right tools to support the content knowledge. I really liked Student 11's response. She believed that both teachers and students should be provided proper instructions for using online learning tools, strategies to be adopted and objectives of the lessons before the classes start. I was happy that students knew the problems and were able to indicate them clearly through their responses. From their responses, I also felt that I did not clarify the instructions and objectives of problem-based learning to the learners before starting the training. I had thought that if I tell them beforehand about all the steps of PBL, learners might jump to the conclusions in the start and that way the purpose of self-directed learning and reaching the solutions step wise might not be fulfilled. For my next iteration, I was planning to instruct the learners about online PBL briefly, but Dr. Ge advised me not to do that as the real meaning of implementing PBL would be lost. Next time, I shall make myself clearer about the objectives of the training.

Q2. Do you take tuition other than your college? If so, why?

For this question, the responses I got were mostly because of the unsatisfying performance of the teachers. Some said that they could not afford tuition, some could not find time for that otherwise they would also have gone for tuition and one student responded that she had joined the tuition because she got together with her friends, and they worked in groups there

which helped her in her study. Majority of the students' responses reflect that they are unsatisfied with new teachers' performance.

Q3. The Interns and CTIs that we have are mostly MPhil or PHD but still the response of the students in their classes is not satisfactory. What do you think is the reason behind that?

Majority of the responses indicated that teachers had the content knowledge, but they did not know how to deliver it. So, the knowledge of the teachers was not questionable. Some students also responded about the confusion of both teachers and students that occurs due to the mismanagement in online classes. The responses reflected that teachers need to work on certain skills that are extremely important for online classes.

Q4. Are you satisfied using the tools that these new hires use for classwork, instructional methods and to communicate with you? Give your rationale in both cases, Yes or No.

All the students responded in No indicating that they remain confused in classes, teachers are not experienced, there is no common online learning platform, and teachers do not have proper skills to manage online classes.

Implementation

Participants

Asima, Khadija, Mahnoor, Naureen, Sadaf, Zahida (Participants did not have any objection on sharing their names that's why no codes or alternatives have been used)

Activity 1: Individual Task

25 minutes were decided for this activity. It was about encountering and exploring the problem. Part 1 of a problem scenario was given to the new hires. They were supposed to read it and write down the key points. The purpose of this activity was to realize that delivering content

knowledge was not enough. My expectation from the new hires was that they may start thinking of keeping their content material, pedagogical methods, and technological intervention synchronized on a single platform. They must realize how haphazard Annie's methods were to deliver content online. It was also expected that the learners would be able to relate this problem to their background knowledge.

Problem Scenario: [Problem Scenario \(Part 1\)](#)

A Google Docs sheet named 'Learners' Space 1' was created for the new hires. The questions and responses of the learners can be found through the link given below.

[Learners' Space 1](#)

25 minutes were planned for this activity, but learners completed the activity in more than 35 minutes. Some learners complained that they were unable to access the document. I made sure that I had shared the document with all of them. It was shared with them still a few of them found difficulty in reaching them. I asked them to share their screen with me and I helped them start typing on the sheet. It was just the internet speed on their side. The page was taking time to open and let the learners type. I encountered a weird problem from Mahnoor's side. She had software in her laptop. Whenever she tried to click on the link, the software popped up on the screen and she could not even open it. We tried to resolve the issue together but failed. Then I emailed her the document, and she was able to type then. This type of situation was beyond my knowledge, so I said sorry for the inconvenience and encouraged her to complete the task. For my next iteration I am going to give at least 30 minutes for this activity. I did not mention time because I wanted the learners to work without any stress or time limitation. Next time, I shall try to keep the time limitation in view.

The responses of learners on the Learners' Space 1 were almost similar. I felt that they were going in the right direction. The analysis of the answers is as under.

Analysis and Reflection

Q1. What is the scenario all about?

Majority of the learners' responses indicated that Annie did not know how to manage online classes and this mismanagement frustrated her although she is an enthusiastic teacher.

Q2. Do you think that there is a problem in this scenario? Give your rationale in both cases, Yes or No.

Everyone responded in Yes. Naureen believed that the problem was because of being untrained and new in the field. Zahida and Sadaf talked about the inefficiency of time and technology management skills.

Q3. Have you ever been in a situation like Annie's? If so, tell us about your experience.

Everyone had experienced the same problems as Annie. Most of them mentioned their experience in the context of Covid. Through our discussion, I came to know that all of them were still facing those problems. Sadaf was one of the learners who had an experience of using Microsoft Teams at her previous job place. She shared her experiences with all of us and it seemed that she had managed her classes well. She continuously stated that her experience was good with online classes, and she did not face many problems.

Q4. What would you do if you were at Annie's place?

For this question, the responses I got varied. I kept my feedback to myself at this point as I felt that their responses would not solve their problems in real life. I will highlight my feedback here. Asima said that she would try to send a recorded lecture, planned assignments or any layout for their help. (How will that solve her problems? That's what they are already doing) Khadija

would prefer to assign proper time for every activity designed for her students. She would send them lectures, share her notes, and check their assignments in time. (This seemed to be a little better response but only time management will not be enough. Again, sending lectures, sharing notes, and checking the assignments in time are not the solutions. They are already doing this) Mahnoor would discuss it with her other colleagues and find the best way to do it. (This could be a considerable option but what if her colleagues are unable to help her because they also have the same issues already) Naureen would send lectures both audio and video and would have a proper time to check the assigned tasks as she had been doing throughout online classes. (Again the similar response that is not an effective solution) Sadaf would consult her other colleagues or friends teaching online to know how they manage it all. She would also discuss the problem with the administration to show some way to solve it. (A little better approach because the teachers who already have a good experience of online teaching might be able to advise her well) Zahida would plan a strategy and share it with her class. Then they would see what suits them the best and go with it. (This approach is different but students have no experience of teaching at any platform. How can they give a good advice or help her to plan a strategy)

Q.5 What would have the Head of the Girls Branch suggested to Annie that solved her problem.

For this question also, I wanted to give them my feedback, but I held it to myself. Again, highlighting my feedback here. Asima responded that she might have given the suggestion to improve her skills for taking online classes. (But how will she improve her skills) Khadija said that being an experienced person in her field, the Head would have given Annie some of her very sagacious tips so that Annie might not face any difficulty in future. Mahnoor said that maybe she suggested a better plan for working. Naureen said that her Head might have told her to change

the setting of WhatsApp groups to admins only and might have told her to manage the classes and assigned tasks in the given time frame. (This advice may not solve Annie's problems).

Sadaf said that she might have suggested changing the settings of her WhatsApp students' group first. Her WhatsApp group setting should hold Annie as the administrator and only one who can send messages. This way unnecessary traffic of students' messages could be avoided. Also, students should also be instructed how they are supposed to submit their assignments. For that a separate group for submitting assignments could be created. And one effective solution is Microsoft Teams - a hassle free platform for academic interaction between the teacher and students. (I could see that Sadaf had used Microsoft Teams before that's why she brought it in. Still how can Annie use Microsoft Teams without knowing how it works) Zahida said that she could have suggested ways that would benefit her in facing the challenges. She could have devised a strategy herself and shared it with Annie. She could have provided the teachers proper training before starting the online teaching sessions. (Zahida's response seemed to be fulfilling my expectation from this activity)

Activity 2: Individual Task

20 minutes were decided for this activity. This activity was to identify and define the problem. The learners were asked some questions through 'Learners' Space 2'. They used their spaces on that Google Docs sheet and after that an open-ended discussion was conducted based on the responses of the learners. Please click the link below to see the questions and students' responses.

[Learners' Space 2](#)

Analysis and Reflection

Learners completed this activity in time as they did not find difficulty in accessing the page and were getting familiar with the flow of the training session. So, the time limitation for this activity for the next iteration will be the same. All of them had identified the problem well. Asima, Mahnoor, Khadija, and Zahida's responses seemed more specific and valid.

Activity 3: Group Work

25 minutes were planned for this activity. Learners were divided in 2 groups, each group containing 3 members. Now the learners were supposed to research the problem. I shared a link from my Google Drive account containing two articles about the importance of LMS. The learners were supposed to choose any article of the two, read it and discuss what they found out through their own resources and the resources provided to them by me. We discussed different points based on the learners' responses. It was an interactive discussion.

PDFs for Articles: [LMS](#)

Responses of the Learners

Group A

During the session, and before starting the activity, Asima texted me privately in the chat box saying that she had never heard of the term LMS before. She was too shy to share it with the other group members feeling that they might make fun of her, or she might feel awkward with. I encouraged her to first go through the article and then we can discuss it later. I also asked her to mix up with the group members once she was done with reading the article. After reading the article, thrice, Asima and her group let me know that they were done.

During the session, Sadaf texted in the chat box that it was so boring. Zahida seemed to be reading the article with more focus.

Group B

Khadija, Naureen and Mahnoor complained that they were feeling some kind of cognitive load after reading this article as there were new terms and concepts in it. They also raised the point that they did not feel related to the content material as it had nothing to do with their subjects. I think they raised a very good point and later after a week of the session, Dr. Ge also suggested that there should be subject related articles and they should be more in number so that learners may choose any article from the choices. For my next iteration, I will add at least 08 more articles showing the use of LMS in different subjects and at different levels. When we had a discussion later, I explained what LMS is, how it works and I told them that they should not feel overwhelmed as they already know what it is, they just did not use the exact term LMS in their daily use. They agreed to this point and Sadaf then said ‘Oh I did not know that Microsoft Team was LMS’. Initially I felt that the teachers were feeling bored, and they were tired until now. But later part of the activity that was based on discussion was quite interactive and all teachers engaged with each other quite well.

Analysis and Reflection

Both the groups chose the same article containing lesser pages and even they had chosen the article with 5 or 6 pages only, but they took much time for this activity. They tried to read each word and during our discussion, Asima and Mahnoor were texting me separately saying that please don’t start the discussion yet as they were still reading This was not my goal. For my next iteration, I shall give 40 to 45 minutes to this activity. Again, Mahnoor and Khadija had some problems opening the link to access the document. I had included 2 articles in the LMS folder. They were simply about the importance of LMS and how they work. Another thing that I

observed was teachers were not telling their problems in the chat box. Throughout the training session they did that. What they used to do is email or text me separately. I did not want to look at my cell phone during the conversation as it was diverting my attention from the screen. During this activity Mahnoor even called me to let me know that she could not access the document. I asked her not to get worried and I sent her the link via email. I requested all the participants to say anything about the session in the chat box only. Mahnoor probably did that because she already had the problem accessing the document in the first activity. By telling me in front of everybody, she might have felt embarrassed. I tried to give all the participants this confidence that we are all learners here and it happens to everyone when they are using technology. Unexpected things happen even with the experts.

Activity 4: Group Work

20 minutes were assigned to this activity. This activity was about investigating possible solutions. This was also a Group Activity and the same groups participated in this task. I asked the learners to think and write about the possible solutions and discuss them openly. I shared the remaining part of the problem scenario in which the Head of the Girls branch had proposed a solution to Annie. Instructor asked the learners to read the remaining part, discuss it in group, and compare it with the solutions that the learners had thought of. The next part of the Problem Scenario is as under.

[Problem Scenario \(Part 2\) \(Continued from Part 1\)](#)

Responses of the Learners

Both groups' responses, especially Asima and Zahida's responses from Group A and Khadija and Mahnoor from Group B in the previous activity, were closer to the solution provided

by the Head of the Girls' Branch. After discussing with each other, they discussed their previous responses and found out the relevant solutions to be implemented.

Analysis and Reflection

We completed the activity almost in time. It seemed to be a good idea to divide the problem in two parts and let the learners think about the possible solutions that were in Part 2. I think this gap between encountering and defining the problem helps the learners think more critically and attentively. I felt that learners took it as a challenge to find a possible solution in part 2 when they performed the 2nd activity. Through discussion in the chat box during this activity, I have realized that the learners had become more confident as they were participating more in the discussion. Sadaf's responses in the chat box were very detailed and she was very quick in giving her responses.

Activity 5: Group Work

1 hour was assigned to this activity. This activity was about applying the solutions. I proposed a hands-on Group Work activity to design an online classroom based on the solution provided by the head in the problem scenario. I asked the learners to role play. As an example, they created a Google Classroom and navigated through different options there. (Learners could create their own learning management system also. Google Classroom was chosen for a collaborative task). Before they started role playing, I shared a [YouTube Tutorial Video](#) with them to learn the steps

Learners could pause and play the video whenever it was required for better learning. Learners performed the activity (I created my own Google Classroom to be on the same page with the learners and to assist them during the procedure). Learners shared their experience and described whether Google Classroom could be an effective tool to solve Annie's problem or not)

Responses

I analyzed the performance of the learners and created a chart based on understanding of the content, attitude, motivational level, Interaction between each other and with me, and navigation skills of the learners. I used a Line Chart containing 40 scores to assess the performance of learners in above mentioned areas.

Figure 1: Points Scored by Group A

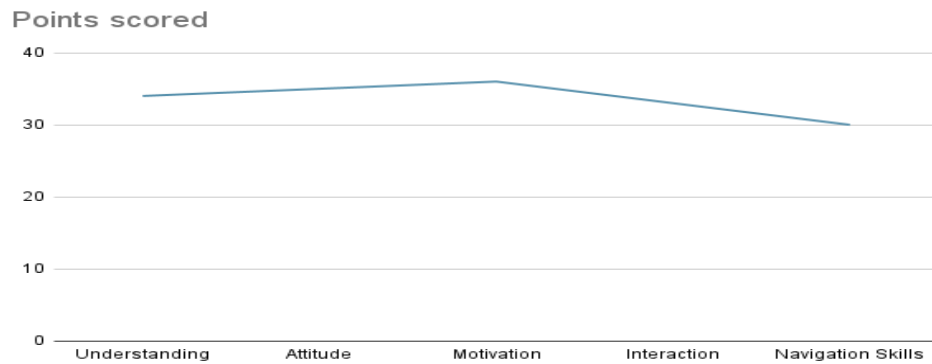
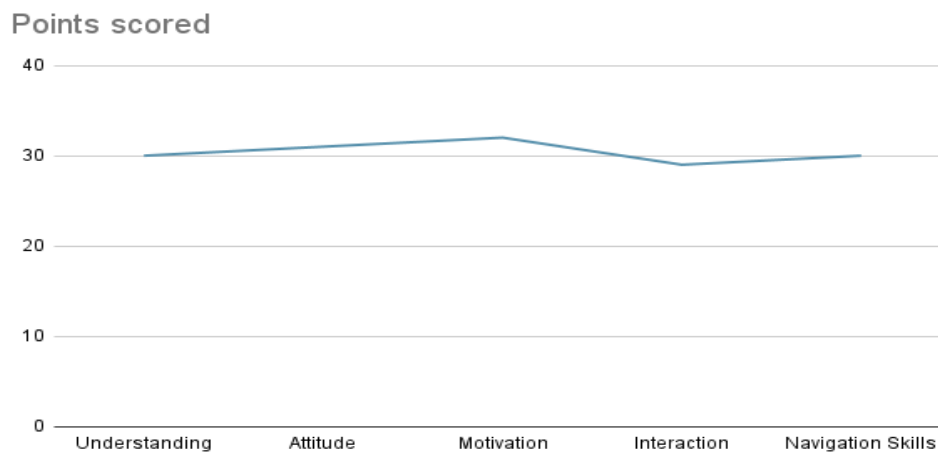


Figure 2: Points scored by Group B



Analysis and Reflection

After looking at Figure 1 and Figure 2, it seems that Group A performed a little better than Group B for this activity. Both groups performed better than I had expected for this activity. They enjoyed doing it. Group B faced these problems that I observed through this activity. Initially they got overwhelmed by looking at the video and Khadija commented that it's impossible to navigate through all options and learn about them in one sitting. Once they started working on it, they were gaining confidence. I helped them throughout the process. Second problem they faced was dragging files, media, or attachments from their devices. Third, when we worked on the posting part of the assignment, they were able to post different forms of the content from their related fields, but I observed that they were running away from posting instructions with the assignments. Once they tried to provide instructions about the assignments, they were neither clear nor detailed. Group A seemed to be more efficient as they navigated the classroom options a little easily. They had good communication with each other. They were helpful to each other. I saw Zahida and Sadaf helping Asima regarding the grading options and selecting due dates for students. They also let her know about the option of sharing the assignments to specific people and how they could also add their colleagues in their classrooms for second opinions. Both the groups performed well. They explored all the options and tried to practice the roles they could play by using those options. We did not get much time to explore the general settings of the classroom in detail. I really wanted more time to explain how these settings can help them customize different options like selecting specific students for feedback, allowing, or not allowing students to edit an assignment, allowing, or not allowing students to respond on an assignment, showing or not showing the grades of students openly. For my next

iteration, I want to focus more on this activity, and I will increase the time for it. I may increase 15 more minutes. I am thinking of not showing YouTube videos to the learners because they got scared by watching it. It was more than 33 minutes. They were losing interest. They felt that it was a lot of stuff to do, and they immediately jumped to the conclusion that they would not be able to do that. Mahnoor and Naureen were quite shy throughout the session but still their roles in their groups were good. They just felt reluctant to talk to me in front of everybody, ask questions or seek help for a confusion. But these two teachers and Asima were the teachers who played the most important role in gathering all the teachers and they also convinced them that this training would be beneficial for them. They were the ones who were always inquisitive about the events that were coming ahead.

Activity 6: Individual Task

30 minutes were decided for this activity. This activity was about the integration of the knowledge and skills the learners learned from this training. I demonstrated the importance of online PBL skills through a brief [PowerPoint presentation](#)

I discussed with the learners about their overall experience of this training session and what they had learned through it. I asked the learners to answer some questions related to LMS and online PBL. The interview questions were prepared on Google Forms.

Please click the following link for all the responses.

[Post Interview Responses](#)

Analysis and Reflection

After the learners had performed this activity, I analyzed the results through this table.

| |
|--|
| Q1. Were you familiar with the Learning Management Systems before this training? If |
|--|

Yes, which were they?

All learners responded in Yes except Zahida. As I mentioned earlier, they knew what online learning platforms were, but they were not familiar with the term used for it. They responded in Yes probably because now they knew about the term also. As far as Zahida's response is concerned, she is the youngest of all who recently joined service and came right after her graduation. She did not have any experience of teaching before that.

Q2. According to you, how effective can LMS be keeping in view the COVID-19 pandemic or any emergency like this?

All of them agreed that it is very effective, and they provided details about it.

Q3. After attending this training, what kind of learning will you prefer? For example, Synchronous, Asynchronous, Blended or In-person. Please give your rationale in each case.

Most responses were in favor of blended or synchronous learning. They also provided their rationale for choosing the kind of learning platform. Sadaf still wanted to go with in-person classes, and she did not keep in view the context of emergency situations like COVID.

Naureen also wanted to be a part of in-person classes, but she agreed that in situations like COVID online learning types are the best.

Q4. Will this training help you use a Learning Management System? If yes, which LMS will you prefer for your classes and why?

Everyone responded in Yes.

Q5. Which features of LMS do you like the most and why?

All answers were satisfactory.

Q6. Which difficulties did you face in using Google Classroom during this training?

Sadaf said that she did not face any difficulty. She just needs more practice. Khadija said that it was quite new for her, so she was facing some problems. All others were satisfied with their performance.

Q7. Were you able to solve different problems that you encountered during the training sessions? Please first name the problems and then explain how you solved them.

All responses were in Yes.

Q8. Was Problem-based learning an effective way to learn? If Yes/No, please give reasons.

All responses in Yes.

Q9. Do you feel self-sufficient in using LMS after taking this training? Please give reasons in both cases i.e Yes or No

All learners responded in Yes except Khadija as she needed more guidance.

Q10. What according to you is the importance of Self-directed learning in online Problem-based learning environments?

Responses were satisfactory.

Activity 7: Group Work

At the end of the training, I assigned some tasks to the learners. I provided a hypothetical problem to the learners. (**Group Work**) They were asked to find a solution by following all 7

steps of Problem-based learning. They could use any tool for this assignment and submit responses to the instructor. The SME gave her feedback on assignments and sent it to me.

[Problem Scenario for Homework.](#) I also asked the learners to complete a checklist for self-assessment and give their feedback about this training through a survey

Instructions for the homework are as under

Please read the problem scenario from the link provided. After reading it, please find out the solution by following the steps of PBL as we did in the training. Describe the online platform that you will use and why. The format of this assignment is not specific. You can give essay type responses or just come up with bullet points. The requirement is to provide a rationale for the solutions of the identified problem and strategies that you will use for better motivational skills. Please use Google Docs for your responses. Your assignments will be checked by one of our subject specialists. Please submit your responses through the Google classroom that I created for you and do not forget to mention your group. For your ease, I have created columns for PBL. You can fill up the information there (Its Optional)

Name of the Group:

| Online Platform Chosen | Rationale |
|------------------------|-----------|
| | |

| |
|------------------------------|
| Encounter the Problem |
|------------------------------|

| |
|-----------------------------------|
| Identify the Problem |
| Define the Problem |
| Research about the Problem |
| Find Solutions |
| Implement the Solution |
| Integrate Knowledge |

Artifacts of Students for Homework

Please click the links below for learners' homework sheets.

Group A: [Response](#)

Group B: [Response](#)

Feedback of SME on Homework Assignments: Please click the following link for the feedback

[Feedback of SME for Homework](#)

Analysis and Reflection

The feedback of the SME on homework suggests that teachers had tried to use advanced pedagogical skills with the help of technology. As it was their first time to implement PBL in their classrooms, it was not flawless, but SME was happy that it was a good try. She suggested the teachers be specific about using the tools, devices, activities, resources, and pedagogical methods. Both the groups did not mention the ways they were planning to scaffold their instruction. Both the groups talked about the value of motivating students, and they suggested

various means to keep students motivated. For example, self-directed learning, autonomy, challenging tasks, appreciation, productive feedback and more. As far as the design was concerned, the motivational skills seemed to be lacking. Group B had done a little better job. Both the groups mentioned that they were using some links, videos, and other resources to conduct different activities in the classroom, but they did not provide links to those resources. So it was not possible for the SME to analyze the content material to see whether it was accurate and relevant or not. SME liked Group B's homework more as they had kept in mind the time limit, chose the learners from their own classes, came out with more authentic plan and she also liked the point when Group B suggested that students can feel motivated only if they have the confidence to be related to the classroom, to the instructor and to the peers. The sense of belongingness can bring confidence in them, and they will perform more enthusiastically. After going through the artifacts of the learners, the SME felt that it was not the right time to expect flawless results from the learners but being the practitioners of implementing PBL for the first time, teachers' job was not bad. They had tried well and came up with good ideas. According to the SME, if they keep on practicing the methods that they were taught in the training, they will improve. This training session was also not sufficient for them to learn online PBL in such a short time. We need more time and effort to train the new teachers in a better way. We just hope that teachers don't stop here, and they may keep designing their classrooms according to modern online literacy skills and may keep implementing them with improvements and changes according to their needs.

Overall Feedback of the SME about the performance of Learners

Please click the following link to access the overall feedback.

[Overall Feedback of SME](#)

Analysis and Reflection

Through the feedback of the SME on an individual level, I derived this conclusion that all the teachers had participated well. The problems teachers faced were usually about accessing different documents and they took extra time to complete the activities. Naureen was quite silent during the training but when she responded in the discussion box, her responses revealed that she was not lost and that she was understanding the content, instructions, and ways to perform different activities. She was just too shy to speak in front of everyone. Likewise, Mahnoor was also shy, and she seemed to be nervous for each activity in the beginning, she had problems with accessing the content and sometimes she felt lost. She was the one who was texting me via messages and she was not using the chat box in Zoom. She felt that she would be embarrassed in front of others. For her ease, I responded to her via SMS which kept distracting me and it was wasting others' time also. For my next iteration, I will try harder so that all learners use the same space for asking questions, interacting with me or peers, providing feedback to others, and to suggest something whenever they feel. Because when someone asks a question and we use the same discussion forum, it can help those learners also who feel the same need or thing but do not express it due to various reasons. For the next iteration, I will try to boost up the confidence of such learners who do not speak or respond as efficiently as they should. I also felt that teachers did not get much opportunity to use the content material related to their subjects. This was a big hurdle for them. Next time, for activity 5, I am planning to let them use their own content material for Google Classroom and they must learn to incorporate effective pedagogical methods with their content material to make the process more authentic and worthwhile.

Checklist

For each question, I used a linear scale starting from 1 to 5 indicating the degree from Yes to No. The results can be seen through this hyperlink.

[Results](#) for Checklist

Survey

Please click the following hyperlink to see the results of all three parts of the survey.

[Results](#) for Survey

Analysis and Reflection

Responses to both Checklist and Post survey suggested that there are some areas that need more attention. I need to make some changes for my 2nd iteration. I will increase some time for Activities 1 and 3. I will add more articles about using LMS for different subjects for Activity 3. I am also planning to include a pre-interview so that I may be able to compare the knowledge the learners get from the training with their existing knowledge. For Activity 5, I am planning not to show the YouTube video as it took much time and learners felt a lot of cognitive loads in one sitting. The time will remain 1 Hour as we needed more time to complete this activity in the first iteration. New teachers did well for the homework assignments. The feedback of the SME on homework suggests that teachers had tried to use advanced pedagogical skills with the help of technology. As it was their first time to implement PBL in their classrooms, it was not flawless, but SME was happy that it was a good try. She also suggested the teachers to Lastly, before starting the training, I want to familiarize the learners with the objectives of the training more clearly.

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Appendixes

[Appendix A: Observation Sheet of IT HOD based on the Report She made in 2020.](#)

[Appendix B: Attendance Sheet](#)

Appendix C: Concept Map

