

## CASE REPORT

## Understanding and uses of collaborative tools for online courses in higher education

Niroj Dahal

Department of STEAM Education, School of Education, Kathmandu University, Hattiban, Lalitpur, Nepal



**Correspondence to:** Niroj Dahal, Department of STEAM Education, School of Education, Kathmandu University, Hattiban, Lalitpur, Nepal;  
Email: [niroj@kusoad.edu.np](mailto:niroj@kusoad.edu.np)

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**Abstract:** This article describes an action research study investigating the understanding and uses of collaborative tools, which are novel to pedagogical practices – using the steps of planning, intervening, evaluating the effectiveness, and sharing potential collaborative tools and/or applications. The research focuses on determining the most effective applications for collaborative tools. Based on the study, this article highlights additional key strengths of collaborative teaching scenarios: their strength in facilitating student tasks and assessments. The time savings are quantified after determining how the collaborative task reduces the time required by course facilitators for manual evaluation. This advancement makes it possible to design multiple collaborative tasks that use various collaborative tools, enhancing learning experiences in higher education. The section then discusses potential collaborative tools and/or applications. Effective utilization of collaborative tools necessitates facilitators with the skills to create a new, innovative, collaborative virtual platform.

**Keywords:** collaborative tools, pedagogical, action research, Moodle, Google Apps

## 1 Introduction

The world has become a global village as a result of the ICT revolution (Can & Bardakci, 2022; Lavidas et al., 2022). Globally, digital learning platforms and tools play a significant role in higher education (Karakose et al., 2021; Mohammed, 2022; Papadakis, 2022). Like in developing countries (Qureshi & Qureshi, 2021) like Nepal, where online course delivery is commonplace, course facilitators have used various collaborative tools for course delivery and evaluation (Kalogiannakis & Papadakis, 2007; 2008). These resources include Moodle's discussion forum, workshops, chat rooms, comment sections, wikis, Google Apps docs, slides, and Jamboard (Bower & Wittmann, 2009; Dahal & Pageni, 2019; Dahal et al., 2020; Dahal et al., 2022). Universities in Nepal are increasingly using collaborative learning scenarios in their online master's, MPhil, and doctoral programs in higher education. There are now more opportunities to support collaborative and cooperative learning in online education, thanks to the widespread use of ICT in teaching and learning (Muyinda et al., 2015). The foundation of collaborative learning is the idea that knowledge is socially constructed, even though each learner has control over their learning (Alafodimos et al., 2009). According to Vygotsky, interaction with others can improve one's learning ability. Effective student interactions can be motivated and maintained, but this is not easy. For that reason, curriculum, pedagogy, and technology must be planned, coordinated, and put into practice (Karakose et al., 2022; Stahl et al., 2006).

On the contrary, the university offering the most courses, overburdened instructors with academic assignments, or sizable class sizes are a few possible causes of this (Kikilias et al., 2009). The KUSOED, a pioneering institution in Nepal with the motto "Transforming Education and Society" – integrating technological tools into instructional practices – used collaborative tools sparingly before this was developed and implemented. This research attempts to reduce the time needed to assess how well students completed tasks(s). Which collaborative tools – "forum discussion, workshop, chat, comment, and Wiki in Moodle, as well as docs, slides, sheets, and Jamboard in Google apps" (Dahal et al., 2020) – can support the students' task(s) and/or assessment(s)? Do the current collaborative tools offer insufficient task and assessment facilitation? In particular, how does the group project speed up the course facilitators' manual evaluation time?

According to this philosophy, cooperative teaching exercises should accompany the curriculum to facilitate student task completion and assessment (Katsaris & Vidakis, 2021). To fill the void and meet the demand for collaborative tools in the current situation, the researcher chose the tools mentioned above, such as Moodle and Google apps. These tools help facilitators develop and evaluate student(s) work (Alafodimos et al., 2009). This study investigates the

design of scripted collaborative learning scenarios in Google apps and Moodle. The design of numerous collaborative tasks using various collaborative tools is now possible in higher education, improving learning outcomes.

In the academic world, collaborative learning is ubiquitous, especially in higher education (Lazarinis et al., 2022). It has many benefits, including instantaneous and fair feedback, an evaluation that does not take extra time, and many other benefits (Karakose et al., 2022). When students are expected to learn through group projects, collaborative learning is appropriate so far (Nugroho et al., 2022). This situation led the researcher to conclude that a collaborative learning scenario on the Moodle platform consists of “three interconnected entities: users, learning system, and collaborative tasks, whereas it is individual-based in Google Apps” (Dahal et al., 2022). The user entity in Moodle comprised participants and facilitators, collaborative learning systems, and participant- and facilitator-performed collaborative learning tasks.

“Learning systems are frequently utilized to aid students in completing the learning tasks designed by facilitators. In this situation, Learning Management Systems (LMS) can be used as effective systems for e-learning processes” (Dahal et al., 2020). Facilitators use the learning management system (LMS) to create and evaluate courses, while students use it to complete learning tasks, submit content, and interact with their peers and facilitators (Karakose et al., 2021). Moodle and Google Apps are two of the most popular and widely used open-source learning management systems (LMSs) for collaborative task management(s). Cooperative tools aid and support the administration of learning tasks, but facilitators are still necessary. Facilitators at the KUSOED use the “Moodle platform and Google apps to support both on-campus and blended modes” (Dahal & Pangepi, 2019). However, this system restricts student collaboration in educational activities in several ways.

Likewise, the paper is organized as follows: The first section will discuss the collaborative tools on Moodle and Google apps. A review of related literature is presented in the second section, and procedures are described later. The paper goes over the conclusions, and suggestions for additional research are made in the paper’s conclusion.

## 2 Moodle collaborative tools review

The collaborative tools included in Moodle across all versions are reviewed in this section.

### 2.1 Forum discussion

Through posting comments, learners and facilitators collaborate in the forum discussion. There are four standard forum categories, and facilitators or other students may grade forum posts. Therefore, a forum can significantly contribute to effective online communication and community development. Even in educational contexts, forums can serve a variety of novel functions. (see Figure 1)

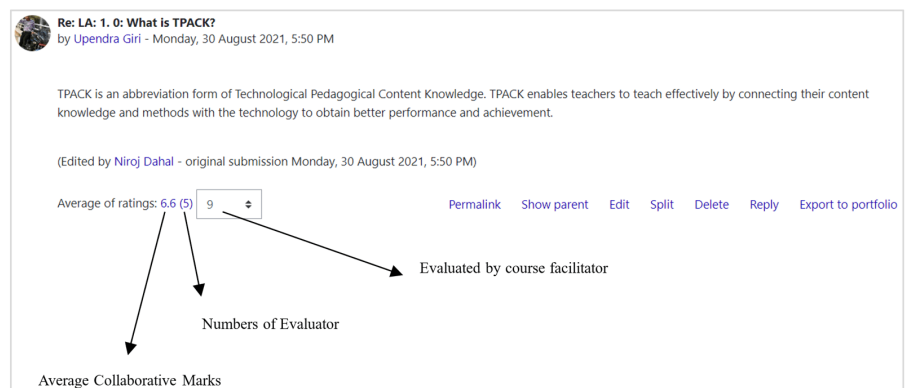
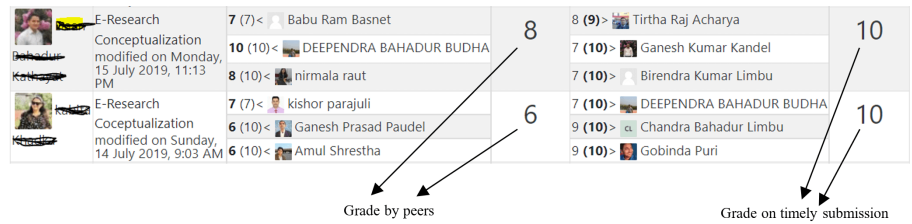


Figure 1 Students’ responses to forum discussion

### 2.2 Workshop

Multiple options exist for this peer evaluation activity. Students can submit their assignments using an online text editor and attachments. A student receives two grades, one for the submission and one for the assignment. In addition, students have access to their work and peer evaluations of other students’ work. (see Figure 2)

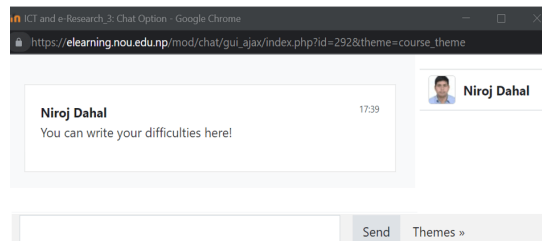


**Figure 2** Students’ evaluation of peer work

### 2.3 Chat

Another tool for group learning is this one. With the help of the module’s chat feature, learners can have synchronous, real-time conversations with other Moodle course participants and course facilitators.

Chat rooms operate very differently from asynchronous forums, a valuable way to gain new perspectives on one another and the subject. Various tools are available in the chat room for managing and reviewing chat conversations. (see [Figure 3](#))



**Figure 3** Chat interface

### 2.4 Comment box

This is another collaborative tool that can be found on Moodle. It enables students to post their questions, concerns, and solutions to various issues. The summary that is presented below will assist in better conceptualizing it. (see [Figure 4](#))

### 2.5 Wiki

A wiki is a collection of web pages that multiple authors in collaboration have written. Simply put, a wiki page is a type of collaborative web page that can be created in the browser by anyone in the class at any time. The initial page of a wiki is called the front page. Every student can contribute to the Wiki by adding additional pages or merely constructing a link to a page that has not yet been created. The encapsulated explanation that follows will be of assistance in better comprehending it. (see [Figure 5](#))

Wiki, therefore, has the potential to be a helpful tool for teamwork on projects. The entire class of learners can work together to edit a document to produce a session product that they can edit with the facilitator and other students. (see [Figure 6](#))

## 3 Review of Google’s collaboration tools

This section provides an overview of the collaborative tools incorporated into Google apps.

### 3.1 Sheet, Docs, Slides, and Jamborad

“Real-time task collaboration, including the ability to create, edit, and share documents online” ([Dahal et al., 2022](#)), when required, as well as to access them and keep track of changes made to documents of all kinds. It also makes it simple for the entire class of students to work together on document editing to create a session product. An alternative is for each student to have a copy and work with the teacher and other students in real-time. (see [Figure 7](#))

## 4 Literature review

A robust platform for supporting teaching-learning activities for students in a classroom setting has been the LMS. As was mentioned in the introduction, one of the more significant and

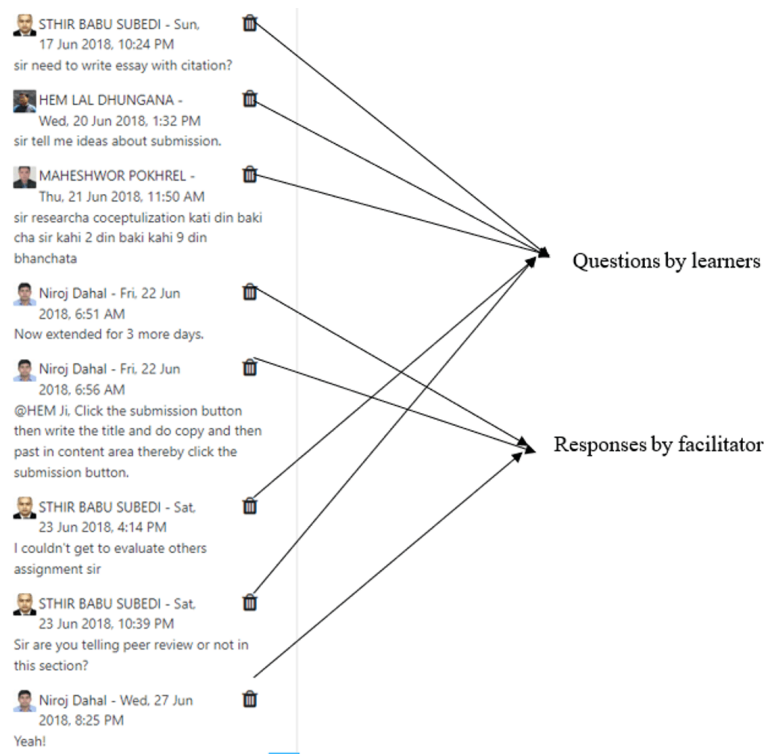


Figure 4 Students' engagement in the comment box

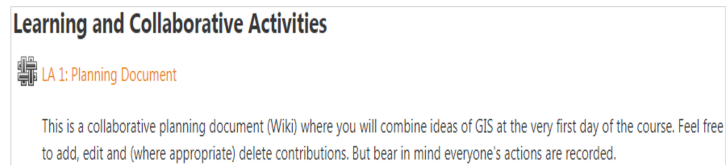


Figure 5 Wiki activity

How do you define GIS?

Created: Friday, 22 February 2019, 8:29 PM by Niroj Dahal

| Diff | Version | User                | Modified |              |
|------|---------|---------------------|----------|--------------|
|      | 14      | Darshana Shrestha   | 8:26 AM  | 29 May 2019  |
|      | 13      | Avasthree Shakiya   | 6:20 AM  | 6 March 2019 |
|      | 12      | Subekshya Sherchan  | 9:01 PM  | 5 March 2019 |
|      | 11      | Shyamhan Budhathoka | 8:38 PM  | 5 March 2019 |

Figure 6 Multiple attempts by learners



Figure 7 Logs of Docs, Slides, Sheet, and Jamboard

well-known free LMS is the Moodle platform. The Moodle learning platform was created to offer educators, administrators, and students a reliable, secure, and integrated system to design individualized learning environments. Likewise, the free, web-based Google Docs package, which also includes Google Sheets, Google Slides, Google Drawings, Google Forms, Google Sites, and Google Keep, includes a word processor called Google Docs.

The literature contains numerous issues with LMS in general and the Moodle system in particular. These problems resulted from using Moodle to enhance in-person instruction or online & distance learning (Kuk et al., 2011). Considering this, some researchers have been looking into how Moodle-supported student evaluations can help with assignment creation, auto evaluation, and formative assessment (Dahal, 2019; 2021).

The development of commercial LMS and their shift to open-source platforms have attracted more research attention. These in-depth analyses focus on and examine Moodle's group evaluations. There are some restrictions with Moodle, although it is widely used in Nepali educational institutions and provides many advantages for facilitators and students "to learn and develop collaborative tasks" (Dahal et al., 2020). Further development is required for this system to be fully functional for group learning (Dillenbourg et al., 2001). The work of instructional designers, developers, and researchers led to the creation of Moodle. The system has been enhanced by the growth of the services that enable adding new functionalities. These works are tested in numerous educational institutions worldwide with learner communities and facilitators (Mazza & Milani, 2004; Dahal et al., 2022).

On the other hand, online collaboration tools can enable learners to develop their learning abilities even when working in different locations. An excellent online collaboration tool reduces the possibility of missing important events and ensures that everyone cooperates on a given task. The gain from a collaborative process that brings individuals together to: resolve complex problems, learn new information, enhance communication, produce innovative ideas, and increase effectiveness and productivity (Dahal et al., 2022).

## 5 Methods

This action research focused on courses offered for the first semester (August 2021 to February 2022) of the ICT in Mathematics Education course of one year B.Ed. in Mathematics Education, and its usefulness was observed throughout the semester (McNiff, 2013; Dahal & Pangeni, 2019). It was conducted in the context of the researcher's teaching practice (McNiff, 2013; Dahal & Pangeni, 2019). The study employed the action research cycle presented in its four phases, Phase I, Phase II, Phase III, and Phase IV (Dahal & Pangeni, 2019). First, the study's initial phase was devoted to identifying the potential applications for collaborative tools. This results in identifying the different types of intervention required. Second, I taught the students how to use collaborative tools during Phase II. Finally, in phases III and IV, I analyzed the findings through participant interaction and self-reflection (Mills, 2003). The number of students who participated in the study was 13, with 11 boys and two girls.

## 6 Findings and lessons learned

In the following section, the results from each stage of the action research cycle are presented, interpreted, and discussed thematically:

**Benefits of collaboration tools.** It was fascinating to learn how the students handled collaborative work. Each learner has a different idea of the task because it appeals to them. Following what was said, the researcher carried out a survey and an interview, elicited ideas from the students, and evaluated their peers' work following the guidelines. All of the learners also agreed upon the fact that the group projects were peer-reviewed as a worthwhile learning activity. Peer review was thought to be a more effective way for students to correct and be corrected in their work on the collaborative assignment(s). The students agreed that participating in this collaborative activity encouraged them to interact with and/or provide feedback to their peers to foster a culture of sharing ideas.

**Collaborative tools challenges.** The tasks were engaging and challenging for the first time, and collaboration was the facilitating factor. However, in light of the submission and evaluation criteria, it was challenging to support their logical fallacies. According to some students, it was challenging to grade their peers because they were concerned that they might be critical of the grade they received for a group project (Kennedy, 2005). For a single assignment, students had to work twice as hard. Most traditional assignments are completed and handed to the course facilitators, but for this process, it must review at least one or two of peers' submissions (Echeverria et al., 2011; Dahal & Pangeni, 2019).

**Lesson for the students.** The instructors then created a group project with submission and peer review requirements. It will be the student's responsibility to submit their homework and grade their classmates' work. The students managed to gauge how stringent the rules were throughout this process. Furthermore, in the specific instance, comments and criticism were significant. Some students, however, did not seem to care about the evaluation standards. They did not just give an entire grade; they also offered criticism and comments that did not meet the course facilitator's standards(s). The students were not thinking about the rules for peer evaluation as they were examining their grades, comments, and feedback (Machado & Tao, 2007). Therefore, one student's fairness in marking, commenting, and giving feedback to other students would be a critical factor in this activity.

**They were developing, utilizing, and reflecting on collaborative tools.** According to the various stages of collaborative activities and tools, the course facilitators must set up in the first phase once each option has been painstakingly put together with every component. Students submit their assigned work on time during the submission phase to potentially review their peers' submissions following the evaluation criteria. The course facilitator(s) had to approve the evaluation's final grades and make a few closing remarks as the phase's last action. During the activity phases, students assisted with reviewing, grading, commenting on, and providing feedback to their peers. Consequently, collaborative tools include various essential tools that support the teaching and learning process for students and course facilitators(s). These tools may also help alter the learning culture in higher education by making learning a part of the assessment (Dahal & Pageni, 2019; Dahal, 2019).

**Learning took place.** The facilitator should be responsible for creating, coming up with, and carrying out collaborative activities. The activity's technological components will require more time from the facilitator to conceptualize and develop. All essential elements, such as instruction and evaluation, are included in the planned collaborative activity, allowing the facilitator(s) to perform their duties to the fullest extent (Martin et al., 2008). The collaborative activity may require a manual review that warrants careful thought. The obvious benefit is that the facilitator's workload is decreased by maintaining grade records, grades, comments, and feedback. When such activities are implemented, the course facilitator's manual workload may be reduced(s).

## 7 Conclusions

It is concluded that the collaborative learning course structure could increase the group participation of individuals. The primary action goal of this study was to implement collaborative tools in teaching to support student tasks and assessments. The collaborative tools for teaching and learning that are available through the Google apps and Moodle are highlighted in this paper. Undoubtedly, students can advance their skills, knowledge, and competencies by employing technological platforms to implement collaborative strategies in the classroom (Khalil, 2018). During class discussions, students have numerous opportunities to transform their passive knowledge into active knowledge. Using Moodle and Google applications as an alternative to traditional online teaching and learning methods enabled students to learn collaboratively and incorporate instructor feedback for skill development. Most students also enjoyed using these applications due to their simplicity and convenience. This study demonstrates the benefits of using online learning tools for collaborative online instruction with students at Kathmandu University in Nepal, so it is safe to assume that teachers no longer need to be concerned about manually evaluating student submissions.

Further, these applications' practicality and critical insights are easy to use, reduce teacher workload, and engage students in learning by having them read and evaluate peers' work. "These tools would support to design and evaluation of collaborative learning scenarios that were integrated into the Moodle and Google apps" (Dahal et al., 2020), despite the expedited nature of this study. In order to implement collaborative tools while teaching, I created various instructional collaborative tools, including forums, workshops, "chat, comment boxes, Google Docs, Slides, Sheets, Jamboard, and Wiki" (Dahal et al., 2020). This paper describes the interactions between the course facilitator and students. The conclusions drawn from these experiences allow the readers to establish innovations in Moodle and Google integrated collaborative teaching and learning.

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## Conflicts of interest

The author declares that they have no conflict of interest.

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