Promoting the Learning of Wikis through Video Tutorials, Mentoring and Hands-On Training Approaches

Sandhya Kode, Shuchita Rao, Nagaswetha Pavuluri, Vamsi Pullakavi, Rakesh Reddy

EnhanceEdu

Centre for Education Technology and Learning Science

International Institute of Information Technology

Hyderabad, India

e-mail: skodev@iiit.ac.in, shuchita.rao@gmail.com, pnswetha@gmail.com, vamsi.pullakavi@gmail.com, t.rakesh.reddy@gmail.com

Abstract—**Technology is changing and at a very rapid pace. New tools are being developed and coming to the forefront on almost a daily basis. Instructor–led workshops that train faculty and students in the use of new tools can be expensive propositions for educational institutions. Scalability and ensuring uniformity in delivery of content become challenges. To address the problem of making the training cost-effective and to facilitate self-paced, independent learning in large groups, EnhanceEdu employed three different training approaches to provide hands-on workshops in the use of the open source tool, MediaWiki, to an audience of students and teachers from various colleges in India. This paper describes the three approaches employed in conducting the hands-on workshops. It also determines the factors that contribute to participants' engagement in learning and the likelihood that they will continue to use the new tool.**

Keywords- open source tools, hands-on, video tutorials, MediaWiki, self-paced learning, collaboration

I. INTRODUCTION

The traditional teaching model involves an instructor-led teaching approach and includes long lectures given by an instructor with no hands-on activities provided to students. It has been observed to have the following drawbacks.

- The instructor becomes solely responsible for the learning process of a large numbers of participants
- The instructor often finds it difficult to cater to participants who have different learning paces
- Validation of the participants' work in real time depends on the instructor's ability to multi-task between several participants at a time
- Scalability depends on instructor's skill to teach large groups at a time
- Uniformity in delivery of content rests largely on the instructor's skills and energy levels

Research suggests that training is best done using a hands-on and learning-by-doing (LbD) methodology [1]. EnhanceEdu, an initiative jointly sponsored by IIIT-H and Ministry of Communications & Information Technology, Government of India, has been conducting training programs in various open source tools to faculty members and students at over 50 partner engineering colleges in an effort to enhance their overall productivity.

Computer-mediated communication (CMC) refers to the use of networks of computers to facilitate interaction between spatially separated learners; these technologies include electronic mail, computer conferencing, and on-line databases. [2] EnhanceEdu introduced the open source collaboration tool, Mediawiki and conducted training workshops for engineering college students as well as faculty members who came from all over India. Through the use of this tool, spatially separated learners can communicate with each other and collaborate in an online environment. Three approaches were used to conduct the workshops.

Approach A. *Mentor-assisted hands-on workshop:* This approach involved a mentor explaining the features of MediaWiki to a small group of participants (1 mentor per 10 participants) and then providing an average of 20 minutes for participants to practice implementing them. The mentor then moved on to explaining the next concept. 30 hands-on workshops that trained a total of 922 students and teachers were conducted in this approach. No video-tutorials were used in this approach.

Approach B. *Self-paced video-tutorials hands-on workshop* **without** *mentors:* Self-paced video-tutorials that included hands-on exercises were provided to participants. Each participant was given access to a computer and head set. Participants were asked to work independently, viewing the video, and perform the tasks that were related to concepts explained in the video. They had the ability to repeat the video any number of times, pause to perform the steps involved in a task and resume the video for further learning. This is the manner in which they could control the pace of lessons. 29 engineering college students participated in this workshop approach.

Approach C. *Self-paced video-tutorials hands-on workshop,* **supported by a limited number of mentors**: This approach involved use of self-paced video-tutorials that included hands-on exercises. Limited number of mentors (1 mentor for 25 participants) were made available and this approach was used at two colleges. The purpose of the mentors was to help participants to stay focused on learning the MediaWiki tool, to offer suggestions and solutions to problems faced by participants and also to validate

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participants about the accuracy of their work by providing real-time feedback. Each participant was given access to a computer and head set. Participants were asked to work independently, viewing the video, and perform the tasks related to the concepts explained in the video. They had the ability to repeat the video any number of times, pause to perform the steps involved in a task and resume the video for further learning. A total of 130 students and 5 faculty members participated in the workshops that were conducted in this approach.

In all three approaches a set of 3-5 challenges were offered to participants at the end of the workshop. The participants were asked to complete these challenges within an allotted timeframe, often within a week after completion of the workshop.

Why have 3 workshop approaches?

Approach A using LbD methodology. is a hands-on approach supported by mentors. The recommended ratio is 1 mentor per 10 participants [1]. When the learning group is very large, such an approach requires the presence of several mentors and proves to be expensive. EnhanceEdu receives many requests for conducting such productivity enhancement workshops and is often unable to provide the required number of mentors. Thus, scalability of this approach becomes an issue.

To address this issue of scalability, the Spoken tutorial approach [3] developed by IIT-Bombay was adopted by EnhanceEdu. Spoken tutorials are short 10 minute video tutorials which demonstrate the application of software features that the user can practice in a hands-on manner while watching a video tutorial. EnhanceEdu used self-paced video-tutorials hands-on workshop **without** mentors (Approach B) in a workshop with 29 engineering students, and observed that the learners lacked motivation to stay focused on practicing a concept that was demonstrated in the video tutorial. When students hit a roadblock in understanding a concept, the absence of human help and also the absence of validation of their work led to decreased interest in learning and working with the new tool.

The third approach, Approach C, is a combination of the first two approaches. It uses self-paced video-tutorials and in addition, provides a limited number of mentors to assist participants.

A video tutorial to introduce basic functionalities of Mediawiki, a content management system (CMS) was created to allow any user to create and edit wiki pages. One popular usage of MediaWiki is the Wikipedia encyclopedia [4].

II. WHY MEDIAWIKI?

MediaWiki workshops help participants learn concepts using computers and also encourage collaborative learning. For instance, participants in all three workshop approaches were expected to create a wiki page of their department. All the participants shared their views on MediaWiki on a common page where every participant was able to view existing ideas and contribute further ideas. This helped in sharing of ideas between the participants and supported collaborative work.

Using a wiki can help students in several ways. First, they can share work as soon as they produce it. Second, they can create and manage group projects. Online collaborative learning, sometimes referred to as computer-supported collaborative learning (CSCL) if implemented appropriately, can provide an ideal environment in which interaction among students plays a central role in the learning process [5].

A wiki can also help teachers to manage students, projects, and teams, and provide visibility into project and team dynamics for problem analysis and assessment [6]. Teachers can create and maintain a wiki-page for their department. MediaWiki will allow adding, editing or deleting of content created by members of a team.

A wiki can also help in managing routine administrative tasks. For example, one specific area where wiki can help administrators is in the creation and maintenance of an academic calendar for an educational institution.

In the context of learning theories, constructivism refers to a learning process which allows a student to experience an environment first-hand, thereby, giving the student reliable, trust-worthy knowledge. The student is required to act upon the environment to both acquire and test new knowledge [7]. MediaWiki workshops support constructivism and Learning by Doing methodology by allowing participants to work on each concept and to build on them using hands-on exercises.

III. MEDIAWIKI WORKSHOPS

The objective of the workshop was for each student/ faculty member to create a self-profile page using MediaWiki. (see **Figure 1**).
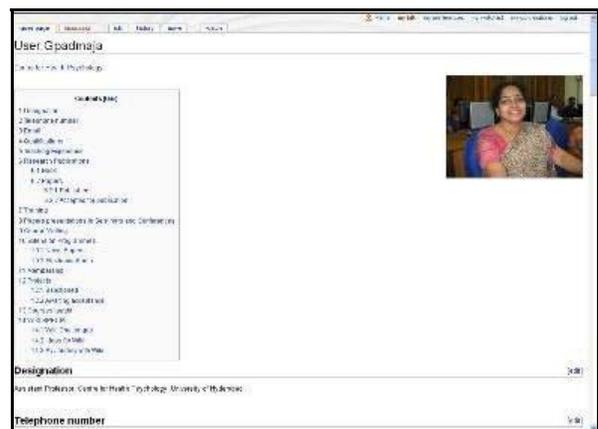

Figure 1 Self-profile page developed by faculty member

The following modules introducing MediaWiki along with hands-on exercises were included in the workshops:
1. Introduction to MediaWiki
2. Creating user accounts
3. Features in a wiki page
4. Basic formatting
5. Bullets – Ordered, unordered, combination lists
6. Tables

7. Internal Page
8. External page
9. Table of contents
10. Uploading files and images

Three examples of challenges offered to participants are listed below:

1. Students were asked to create a project page that described a group project.
2. Faculty members were asked to create a department page that was maintained collectively by members of the department. Refer to **Figure 2** for an example result.
3. Students and faculty members were asked to collaboratively create a wiki-page that contained different ideas on how to use a MediaWiki tool to their advantage.

Figure 2 Department page developed collaboratively by several faculty members

IV. DATA COLLECTION

A. Each workshop's outcomes were measured via pre-workshop and post-workshop surveys. The pre-workshop survey determined the users' prior knowledge about MediaWiki. The post-workshop survey was geared at determining the users' learning and satisfaction of the course and their preferences of workshop format.

The following graphs depict the survey responses from participants across the three workshop approaches.
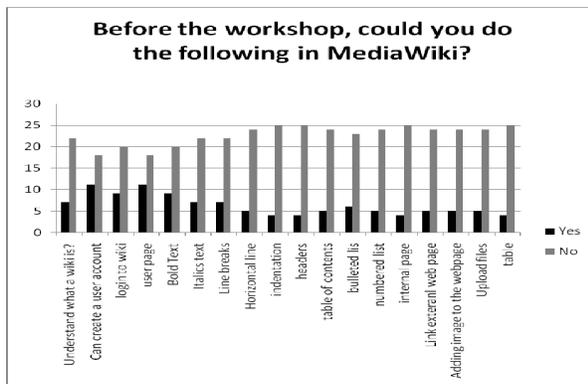

Figure 3 Feedback from 29 Approach B participants on their knowledge of MediaWiki before the workshop
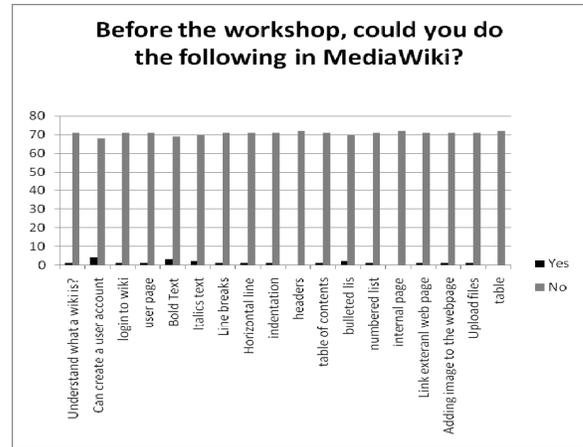

Figure 4 Feedback from 74 Approach C participants on their knowledge of MediaWiki before the workshop
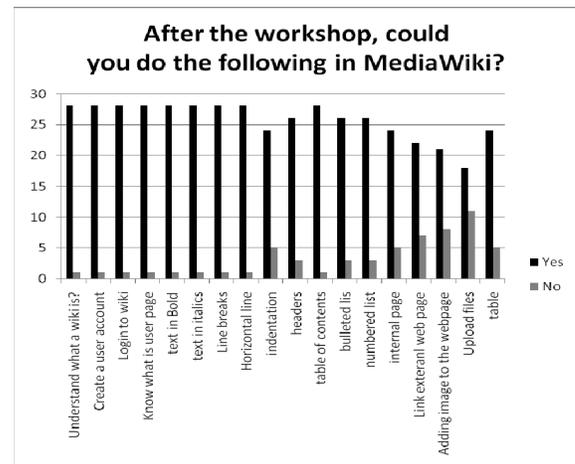

Figure 5 Feedback from 29 Approach B participants on their knowledge of MediaWiki after the workshop

Figure 6 Feedback from 74 Approach C participants on their knowledge of MediaWiki after the workshop
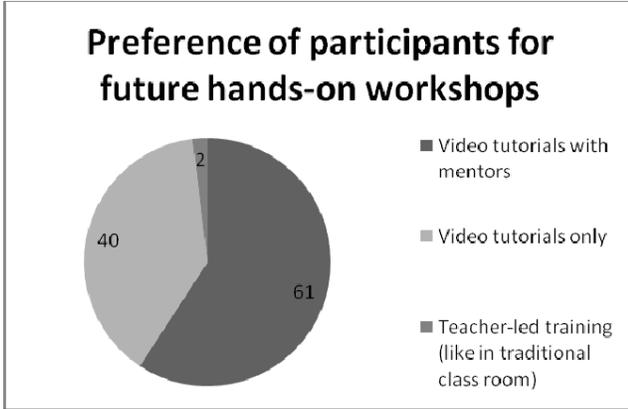
Figure 7 Feedback from participants on their preference of workshop format for future workshops

B. We measured the success of the workshops in achieving the workshop goal: completion of hands-on exercises by participants to create a self-profile. **Figure 8** shows the percentage completion rates of the hands-on exercises in each of the three workshop approaches.
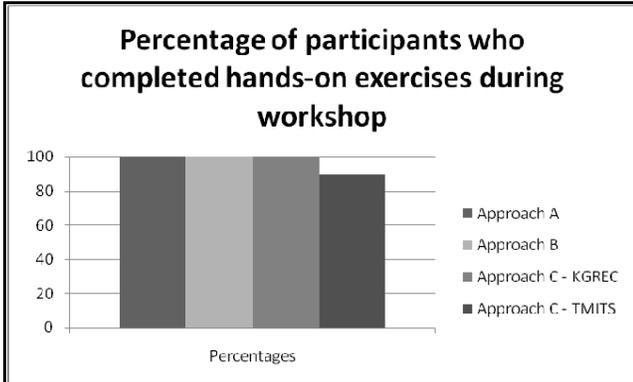

Figure 8 Percentage of participants who completed all the hands-on exercises during the workshop

C. To determine if participants continued to use wiki after the workshop ended, we examined the time-stamps on the revision history of the wiki. We also visited the wiki pages to look for evidence of additional material posted to the wiki-pages in a collaborative fashion. We found that a large number of participants who completed the hands-on exercises in the workshop continued to visit and use their wikis.

Figure 9 and **Table 1** demonstrate that participants from all the workshop approaches continued to use Wiki at varying levels. However, the sample size for Approach B is much smaller than for Approaches A and C.
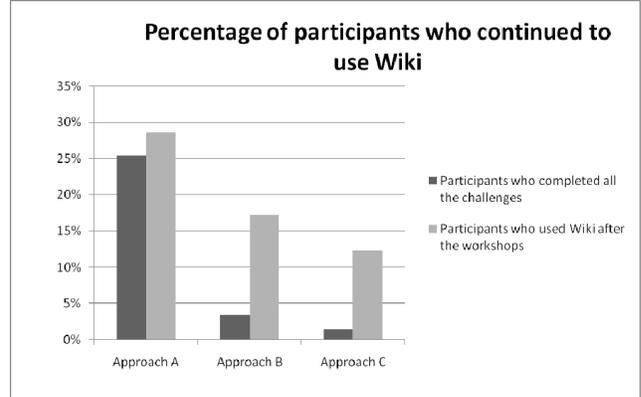

Figure 9 Percentage of participants who continued to use Wiki after the workshop

TABLE 1: CONTINUED PARTICIPATION IN USING WIKI FROM WORKSHOP PARTICIPANTS

Approach	Participants who completed the challenges	Participants who used Wiki after the workshop	Total participants in the approach
A	237	266	929
B	1	5	29
C	2	16	130

V.   OBSERVATIONS AND RESULTS

All participants (in all three approaches) completed the hands-on exercises during the workshops. In Approach **A** workshops, we had a 100% success rate with 929 participants in 30+ workshops in achieving the workshop objective. We had high success levels for workshop groups using video tutorials with and without mentoring under Approaches **B** and **C** respectively (Refer **Figure 8**). We found that conducting training workshops by using self-paced video-tutorials and the Learning by Doing (LbD) approach was scalable and not only engaged learners from varied backgrounds but also promoted independent learning and uniformity in delivery of content.

Referring to **Figure 9**, we see that about 25% of the participants in workshops of Approach A were motivated to complete all the post-workshop challenges, whereas in workshops of approaches B and C, this percentage was much lower.

Referring to **Figure 9**, we see that over 29% of the participants from workshop Approach A continued to use the wikis they created after they completed the workshop. Interestingly, 17% of the users of Approach B, and 12% of users in Approach C, continued to work on their wikis as well. Since the participants of Approach B were those working on B.Tech. projects, we infer that the video-tutorial-only approach met their need and also led to several of them continuing to use their wikis in a collaborative way post-workshop.

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Across all three workshop approaches, 49.5% of participants who continued to use Wiki after the workshop had completed all the challenges.

In a t-test that was conducted for all three workshop approaches with data related to gain in skillset after workshop as opposed to skillset before the workshop (refer figures 3, 4, 5 and 6), it was observed that there was significant gain in participants' knowledge in each of the three approaches. Results show that Mediawiki workshops using video tutorials resulted in significant learning, as effectively as mentor-assisted hands-on workshops. In addition, the video tutorials approach helped to improve scalability without compromising on quality.

Here is the summary of our observations:
1. Mentor-assisted hands-on approach needed 1 mentor for 10 participants. In video tutorials approach only a couple of mentors were needed for 50 participants.
2. Video tutorials approaches helped participants spend enough time on each workshop topic to understand concepts with the help of video tutorials.
3. The participants who successfully completed hands-on exercises during the workshop often continued to use the wiki and attempt the challenges suggested by mentors.
4. Participants who were instructed by the self-paced video-tutorials (with no mentors) had little motivation to complete the challenges.
5. The self-paced video tutorial approach (with no mentors) was more scalable.
6. Dedicated mentor support increased the chances of a student continuing to using the new tool.

A. Mentor-assisted, hands-on workshop approach

Advantages:
- The hands-on approach helped learners feel comfortable with the tool instantly and helped them to understand how the tool worked
- The learners evaluated their understanding of the tool with the help of the mentor and sought clarifications when needed

Limitations:
- The approach was not scalable and hence EnhanceEdu could not meet the high demand for workshop requests
- Slow learners found it difficult to keep pace. Quick learners found the pace of workshop too slow. Hence it became difficult for instructor to control the pace of the workshop in a manner that satisfied every learner
- The cost of conducting these workshops was relatively higher as a greater number of mentors were required
- The mentors lacked consistency in the quality of assistance they provided

*B. Self-paced video-tutorials hands-on workshop **without** mentors*

Advantages:
- Scalable solution as the video tutorials could be distributed to a large group of learners. Additionally, they can be provided to the participants after the workshop for continued use.
- Uniform/consistent quality in delivery of content
- Low cost in conducting the workshop as no mentor was required
- Self-paced learning helped every learner to pace learning according to their individual comfort

Limitations:
- Basic computer skills are a pre-requisite
- Motivation to stay focused through the training was dependent on the progress made by learner in learning new concepts

C. Self-paced video-tutorials hands-on workshop, supported by a limited number of mentors

Advantages:
- Scalable solution as the video tutorials could be distributed to a large group of learners. Additionally, they can be provided to the participants after the workshop for continued use.
- Uniform/consistent quality in delivery of content
- Lower cost in conducting the workshop as fewer mentors were needed
- Self-paced learning helped every learner to pace learning according to their individual comfort
- Presence of mentors helped learners to stay focused in learning new concepts

Limitations:
- Basic computer skills are a pre-requisite

Our observations and results suggest that all three workshop approaches resulted in significant improvement of participants' skill set. Approach B and Approach C helped increase scalability. Approach C proved to be more scalable and also retained the workshop quality.

VI. Future Work

Based on the feedback obtained from the workshop participants, we plan on refining the existing video tutorials in order to reduce mentor workload. We will also create new tutorials for Moodle, SVN and Redmine, the open source tools identified as the most suited for improving productivity at engineering colleges.

As observed in **Figure 9** and **Table 1**, the percentage of participants in Approach B and Approach C who continued to use Wiki after the workshop is lower than that of Approach A. We intend to work on studying use of factors such as motivation levels in learners that determine the continued use of Wiki tool post workshops.

We also plan on using the scalability aspect of video tutorials by providing CD/DVD copies so learners can watch the videos, practice independently and share the content with other users.

VII. Conclusion

We worked with three training approaches to promote the learning of opensource collaboration tool MediaWiki. We found a 100% success rate in meeting the workshop

objective: completion of hands-on exercises by participants to create a self-profile. However, we tried using self-paced video-tutorial approaches without mentors in one case (Approach B) and with mentors in the other (Approach C). In Approach C, with video tutorials and supported by mentors, learners were able to focus on acquiring new skills and attempting challenges. When participants completed challenges within a week or two after the workshop, they developed greater confidence in their ability to use the tool and were likely to continue using it in their daily lives. While greater analysis is required to validate the findings statistically, if future trends in technology rest on acquisition of skills through independent learning, a hands-on video-tutorial approach supported by mentors (Approach C) promises scalability, better student engagement and uniformity in delivery of content as long as students possess basic computer skills and demonstrate a willingness to learn.

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