Timed QnA Forum for Spoken Tutorials

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Abstract. Spoken Tutorials are an instructional methodology to train students on IT topics at a national level through self learning. Problems beginner users face in accessing information from online resources are explained. An online forum through which users of Spoken Tutorials can ask their questions, and also learn from previous discussions, is presented. In this Timed QnA Forum, learners access information by pinpointing the exact time of the Spoken Tutorial at which one may have questions. This forum is helpful not only to the beginners, but also to other learners who participate in massive distributed workshops as well. Discussions in this forum double as document/FAQ for the software.

Keywords: Collaborative content creation, discussion forum for beginners, FAQ generation, Learner Centric MOOCs

1 Introduction

Employability of students is very low in India [6]. This can be partly addressed if we can tackle the problem of low computer programming competency [17]. The Spoken Tutorial project was started to help improve programming skills of students [13,12,5]. Spoken Tutorials are a series of audio-video tutorials of 10 minute duration each.

As many students in India do not have access to good education, self learnability is accorded the maximum priority in the creation of Spoken Tutorials. To achieve this goal, video tutorials are created using scripts that pass a novice check, as shown in Fig. 1. Some other steps undertaken to make Spoken Tutorials accessible to the disadvantaged student community are: (1) Audio is dubbed into all 22 official languages of India, keeping videos in English - this helps students who are not fluent in English, without sacrificing employment opportunities (2) Facilitating offline use by providing a zip file of tutorials on one or more topics (3) Focusing only on open source software, which obviates the need to buy commercial software (4) Releasing the Spoken Tutorials under the CC-BY-SA license.

There are a total of about 1,100 Spoken Tutorials, covering about 75 topics. Including dubbing, there are about 11,000 Spoken Tutorials. Using Spoken Tutorials, more than 6 million college students have been trained during the past 6-7 years [13]. We are now attempting this method to train students on other skills topics also.

Given the great potential that Spoken Tutorial has [5], it is important to provide an online forum for the target audience to interact, and to clear their doubts. This work presents some difficulties that beginners face in using forums in Section 2, and our solution in Section 3. Unexpected benefits of this forum to other segments of the population are explained in Section 4.
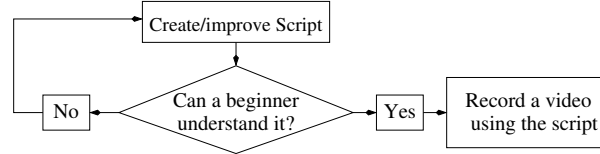
Fig. 1. Novice check of script helps in self learning of Spoken Tutorials

2   Desired features of forums from beginners' perspective

1. Friendliness: Most Internet forums demand certain netiquettes. While some forums are tolerant, others are not, and may result in nasty responses [19]. For a beginner learning to use open source software, this is a formidable challenge. Historically, FOSS forums have not been friendly, especially to beginners. Usage of FOSS requires a higher competence or having a community that is willing to help beginners without being rude [18]. The need to keep forums friendly as a long-term survival strategy has been articulated, however [7].

2. Reading before posting: Forums also ask the user to search before asking a new question. These often appear as forum etiquettes [15]. Sadly, forums become overwhelming and confusing for users to navigate, especially for low Internet efficacy users. Students with high Internet efficacy learn to do this better, however [1]. Novices behave differently from experts, and they need help to locate the information available on the Internet [10,11]. Unfortunately, however, they don't necessarily get helped, as Internet users are more rude online than they are in person [2]. If they don't use the forums well, beginners lose out [16].

3. Constructing useful content out of online collaboration: The main weakness of online tutorials, manuals, FAQs, wikis, bulletin boards, and weblogs that form the documentation for FOSS, is that they are incoherent, unorganised, and incomplete [18,9]. The problem of documentation cannot be solved on a technological level, but by using different methods of storing and retrieving information, in a way consistent with cultural practices [18].

Microlearning is proposed as a way to learn FOSS, and to acquire knowledge in small steps to construct a broad and deep knowledge eventually [18]. Ten minute long Spoken Tutorials, which are in a sense a documentation to open source software, are a step in this direction. It will be interesting if we can

organise discussions that happen in a carefully designed forums to produce useful content. Collaboratively created documentation for Scilab is available through the Textbook Companion project [3].

3   Implementation of a forum with desired features

Keeping the requirements stated in the previous section, we have designed and implemented a forum to answer questions from students. We will refer to it as the Timed QnA Forum.

Django, MySQL database, Bootstrap, HTML 5, CSS 3 were the technologies used to create the Forum module. The main website is in Django, so SSO (single sign on) was possible with a common user login to both modules. The ST video ID is mapped with each Forum question. So the questions can be fetched accurately in both online and offline playback. Fetching of questions is done through AJAX calls, wherein ST website acts as an API that feeds the tutorial names into the Post Question form. This data is tightly coupled between these modules.

Whenever a question is posted, all contributors/authors of the Spoken Tutorial are notified. Subsequently, follow-up mails are also sent as reminders to the authors. The learner who posted the question is also notified when the question is answered. The same is also visible immediately online on Forums.

On the Timed QnA Forum webpage, a slider displays all the software series in graphic form. By clicking on any one of these, one can access all the previously asked questions posted in Forums, till date, for that particular software series. On the homepage, the 10 most recently posted questions are displayed and these are arranged in chronological order. The columns are sortable in ascending and descending order. A typical set of questions asked on the forum is displayed in Fig. 2 (Left).

FOSS ⇕	Tutorial ⇕	Min ⇕	Sec ⇕	Question ⇕	Date
LaTeX 🔍	Report-Writ... 🔍	13-14	50-60	Where to find report.tex file	24-04-20
LaTeX 🔍	Report-Writ... 🔍	00-01	0-10	Error in compiling the code file of rep…	24-04-20
LaTeX 🔍	Report-Writ... 🔍	05-06	40-50	Compiles the first time itself	24-04-20
Python-3.4.3 🔍	Plotting-Da... 🔍	01-02	0-10	errorbar shwoing syntax error	24-04-20
R 🔍	Conditional... 🔍	09-10	30-40	Adding a new column	24-04-20

Fig. 2. A typical set of questions as it appears on the Timed QnA Forum.

Magnifying glass icons are provided below the software series name and tutorial name. Clicking on the magnifying glass icon below the software series name,

shows a list of all the tutorial names on which questions were posted, in alphabetical order. Clicking on the magnifying glass icon below the tutorial name, shows a list of all the questions posted. For example, on clicking the lens next to LaTeX in Fig. 2, we obtain Fig. 3. On clicking the lens next to a tutorial name, one can see all the questions posted on it. For example on clicking the lens next to Letter Writing in Fig. 3, we obtain Fig. 4. Now, one can sort the questions in chronological order. By clicking the Mins (Minutes) button in Fig. 4, one can sort the questions in ascending minutes, as shown in Fig. 5.

Foss	Tutorial Name	Mins	Secs	Title	Date
LaTeX Q	Beamer Q	01-02	10-20	Beamer	17-02-15
LaTeX Q	Beamer Q	01-02	0-10	MiKTex 2.9 and Texnic 2.02 problem	24-03-15
LaTeX Q	Letter-Writ... Q	02-03	0-10	chang of font	29-08-15
LaTeX Q	Letter-Writ... Q	08-09	50-60	'_'(underscore)	29-08-15
LaTeX Q	General Q	None	None	Explanations of Commands of Latex	29-08-15
LaTeX Q	Letter-Writ... Q	07-08	10-20	Subject and Reference of Letter	29-08-15

Fig. 3. On clicking the lens symbol next to LaTeX in Fig. 2, we obtain this figure, which displays only the questions on LaTeX.

Foss	Tutorial Name	Mins	Secs	Title	Date
LaTeX Q	Letter-Writ... Q	02-03	0-10	chang of font	29-08-15
LaTeX Q	Letter-Writ... Q	08-09	50-60	'_'(underscore)	29-08-15
LaTeX Q	Letter-Writ... Q	07-08	10-20	Subject and Reference of Letter	29-08-15
LaTeX Q	Letter-Writ... Q	07-08	20-30	Regarding the closing of letter	29-08-15
LaTeX Q	Letter-Writ... Q	04-05	30-40	Letter Writing	29-08-15
LaTeX Q	Letter-Writ... Q	00-01	0-10	subject in the letter	29-08-15

Fig. 4. On clicking the lens symbol next to the *Letter Writing* tutorial in Fig. 3, we obtain this figure, which displays the questions on this tutorial only.

As all the questions get sorted chronologically, it is easy to locate them on the basis of the time. One can also see all different questions asked at a particular time. One can click on the title of a question to read the full question and the answers posted. One can join any of the discussions by asking more related questions. One can also answer questions that are previoulsy asked.

Foss	Tutorial Name	↓↑ Mins	Secs	Title	Date
LaTeX 🔍	Letter-Writ... 🔍	00-01	0-10	subject in the letter	29-08-15
LaTeX 🔍	Letter-Writ... 🔍	00-01	0-10	Regarding Alignment for Signature	29-08-15
LaTeX 🔍	Letter-Writ... 🔍	00-01	10-20	Letter edition	29-08-15
LaTeX 🔍	Letter-Writ... 🔍	00-01	10-20	Letter Edition	29-08-15
LaTeX 🔍	Letter-Writ... 🔍	01-02	0-10	adding subject	29-08-15
LaTeX 🔍	Letter-Writ... 🔍	01-02	10-20	signature command	29-08-15

Fig. 5. On clicking the Mins (Minutes) button on Fig. 4, questions get sorted as shown.

One can see that all the requirements of the previous section have been met:

1. As the method of posting is easily understood, and easy to follow, even a novice can post questions without making mistakes. As a result, one can say that this Timed QnA Forum is a friendly one that conveys to every user how to post the questions.
2. Next, the sorting method explained above can be used to easily locate the previously asked questions, and one does not have to be an expert to do this.
3. Finally, the above explained method of organising the previous discussion helps produce useful content.

In addition to the above, additional help is provided to answer seekers, as we explain how. While posting questions on the Timed QnA Forum, as one begins typing the text of the Title of the question, we are prompted to view similar previously posted questions on Forum. Clicking on the previous questions link opens a pop-up box with the previous questions listed therein. Clicking on the hyperlinked questions, redirects us to another webpage where we can read the question and the associated answers. In most cases, these could satisfy the learner's query. If not, one can always go ahead and post the new question. This feature is useful and helpful in limiting the repetition of questions. The flow in using the Timed QnA Forum by a Spoken Tutorial user is illustrated in Fig. 6.

4 Timed QnA Forum benefits the general audience

We already saw in the previous section that the three desired features of a forum are available in the Timed QnA Forum presented in this work. We will now present a few additional benefits.

With this Timed QnA Forum, it is possible to effectively and efficiently answer the questions of the participants of large workshops. Questions and answers happen silently, without disturbing others present in the workshop. Once a question is answered, this discussion becomes available to everyone. Participants of
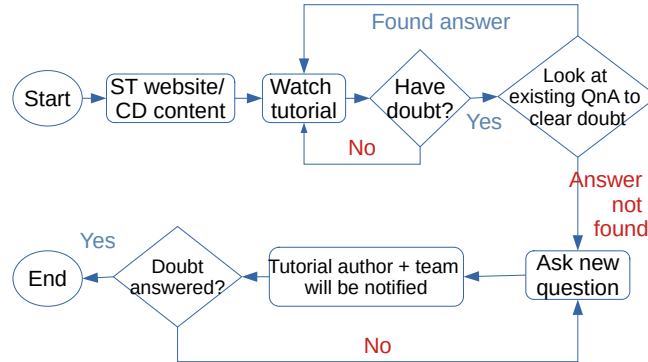
Fig. 6. Flow in using the Timed QnA Forum

a large LaTeX workshop, who were forced to use the Timed QnA Forum, gave a positive feedback [8]: They found the forum helpful, as they normally hesitated to ask questions in a large class, and as they usually missed details of discussion in a live class. They felt that their doubts were answered a lot faster than in a large class. They also felt that they did not have to wait to get their doubts cleared. Their answering pattern also indicated a high level of satisfaction.

The Timed QnA Forum discussed here also helps a lot in distributed settings. The authors' team has organised massive blended workshops for as many as 5,000 simultaneous participants, attending the workshop in 200+ locations [14]. If conventional methods are followed, one would need an expert at every location to clear the doubts. With the method adopted in the Timed QnA Forum, it is possible for a few experts to answer the doubts of several thousand participants. We should also point out that there will not be many duplicate questions, because of the way the forum is organised, as explained in the previous section.

During the COVID-19 pandemic, most workshops have participants from different locations. About 200 participants of a recently conducted DWSIM beginner level workshop [4], from as many locations, found the Timed QnA Forum very effective. When asked to give their feedback about the forum approach followed answers of the following type were obtained: *questions were answered immediately*, *answers were cleared*, *it really helped in solving problems*, *most of the doubts were cleared in the forum itself*, *most of the common questions are already answered*, and *this platform is easily accessible to clear the doubts.*

Finally, the Timed QnA Forum is helpful to address the changes due to versioning of the software. It is possible that an open source software may be changing frequently, especially at initial stages of development. Unfortunately, Spoken Tutorials cannot keep pace with the software releases, as it takes a long time to create, because of the novice check requirement explained in Fig. 1. Whenever a feature changes in the software, one can immediately post it on the Timed QnA Forum at the appropriate location. In Fig. 7, one can see how the change in a software is addressed.
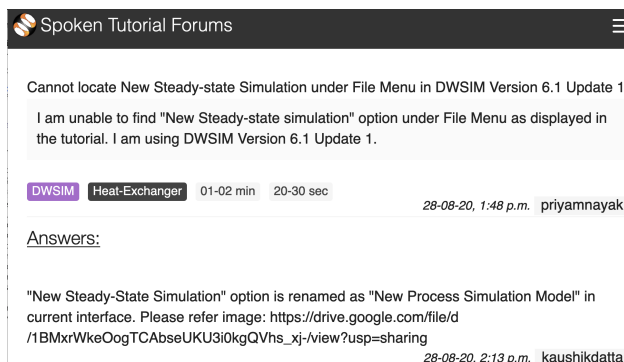
Fig. 7. Addressing difficulties through version changes through the Timed QnA Forum

5   Discussion and Conclusions

The Timed QnA Forum presented in this work encourages learners constructive interpretations to a problem. Peer-to-peer learning is greatly encouraged. Even though the person answering the question may not be an expert, they have enough expertise on the issue asked in the Forum question. It has been observed that learners who engage in this active learning space, are not passively taking in information from the tutorials but are actually discussing and solving their problems from their own learning experiences. If used constructively, the Timed QnA Forum can form a basis for creating FAQs. Its a type of on-the-fly documentation and with a little moderation by subject-matter-experts, has the capacity to help build the software community.

The forum provides networking opportunities, and access to expertise from a wide range of ages, backgrounds and geographies. It offers shy and more reticent learners the opportunity to participate in forum discussions more easily than in face-to-face sessions. When the learners take the lead role of answering a question posted by another learner, they themselves become independent learners.

The only shortcoming of this approach is that this forum is tightly coupled with the underlying Spoken Tutorial, which itself may undergo version changes. We believe, however, that this problem can be tackled through a version-control type technology.

Acknowledgement

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