

A Skill Sharing Platform for Team Collaboration and Knowledge Exchange

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Abstract: Teamwork or collaborative learning processes are known to be highly dependent on the connection and subsequent interactions that are established among the participants. It encourages knowledge creation and sharing, which results in participants developing faster skills with respect to the subject matter. Platforms such as blogs are known to be efficient in stimulating reflection, a sense of community, and collaboration. Thus, in this study, we discuss our blog implementation in SQLValidator, a web-based learning platform that focuses on database-related courses. We further discuss the students' experiences while using blogs as knowledge acquisition tools. Furthermore, qualitative data were collected from the observation of students to gain more perspective about their experiences in using the blogs in their learning.

1 INTRODUCTION

In recent years, there has been an increase in the use of blogs for marketing and business-oriented tactics. However, in a rush to promote the use of computer-mediated technologies, there has been relatively less research conducted on the effectiveness of using weblogs in the educational environment.

From a teaching and learning perspective, blogs can make student learning transparent and become a space “where a greater understanding of student meaning-making can be gained” (Paulus et al., 2009). It is important to acknowledge the fact that students have become more sophisticated in terms of IT and internet “consumption” and as such can process learning differently through a constant exchange of information and discussion. Although embraced by educators for their potential to support student interactivity and collaboration (Godwin-Jones, 2006), blogs remain the object of inconclusive and even contradictory research in education (Stoszowski and Collins, 2014). Furthermore, most of the studies show that student groups of particular courses favored learning through peers' blogs. Some studies report that blogs promote reflection (Stoszowski and Collins, 2014) while others have not found any in-

fluence on reflection (Dalgarno et al., 2013). Previous studies have reasoned the effectiveness of blogs which stimulate learning. However, mixed results regarding the impact of peer blog commenting on students' perceived learning have been noted (Lara and Anderson, 2008). In the current practice of the education system, there are numerous tools to help students to work on collaborative projects, but blogs provide a simple structure to share their learning experience and encourage students to participate in the discussions.

This study sets out to design, implement, and integrate the framework for the blog tool in the 'Report page' section of collaborative computer science-based tasks where students can interact, post their doubts and share their learning experiences; thereby, allowing them to easily collaborate with their tutors and each other. To our understanding, the impact of using such frameworks has not been satisfactorily analyzed yet, giving a platform to investigate further this interactive framework.

The following research questions were considered while examining the effectiveness of blogs on students' learning growth:

- 1) How do students perceive knowledge creation as facilitated by blog-supported discussions?
- 2) To what extent can the integration of blogs in Computer Science related courses stimulate self-evaluation of perceived course comprehension?
- 3) To what extent can the integration of blogs sup-

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port reflection and knowledge transfer in Computer Science based courses?

The following paper aims to conduct research to answer these questions and to design and deploy a blog to further enhance the use of such online learning platforms. This working tool has been examined through a study of questionnaires, surveys, and comments provided by students.

The structure of the paper is as follows: in the next section, we discuss the related works, and in section 3, we describe our implementation. The materials and methods we employed will be described in section 4, and the results and feedback from our participants will be discussed in section 5. We evaluate our feedback in section 6 and present a summary of our effort and possible future effort in section 7.

2 RELATED WORK

Traditionally, blogs have been used as a social tool ideal for brainstorming, where brainstorming ideas are posted as a comment for individuals to share their ideas or opinions. Over the decade, blogging has made its firm professionally, as seen to gain exposure in businesses. The practice of using blogs as an academic tool just as it is used socially needs to be examined further in particular domains.

The concept of reflection has been studied for one's personality and knowledge development. Reflection is "active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends" (Dewey, 1933, p. 9) (Dewey, 1923). The reflection of learning in adult education has also been promoted. Blog posts play a part in making a passive learner active. A collective blog promotes competition, sharing, interaction, and awareness, thereby analyzing what characteristics of students, their blogging, blog grouping and group's blogging affect the students' level of reflection (Kalk et al., 2019).

A research study on use of blogs by Garcia et al. (Garcia et al., 2019) has shown that the previous blogging experience influence the use of blogs further in higher education, when pushed by the teacher. This mainly involves more interactions and showing involvement; however, so far it has not been enough evidence for the activity of involvement as a driver of perceived learning amongst students. Adeleke et al. in (Adeleke and Muraina, 2021) also suggest incorporating the usefulness of blogs into the learning curriculum.

Sawmiller et al. (Sawmiller, 2010) conducts

a study to introspect the role classroom blogging can play in scientific learning and concludes that by integrating the weblog into the classroom and incorporating electronic writing into the classroom experience, students can enhance their understanding of science and champions for the use of blogging in classroom studies.

Twenty-one participants from research conducted by Yang, S. H. (2009) (Yang, 2009), expressed comfort to comment and challenge their peers on the blog framework, rather than discussing the issues face to face. Enhanced interaction allows people to meet personal needs with anonymity and broaden their knowledge without space and time constraints. Blogs could also be used to analyze and monitor students' work and thereby improve their learning. The practice of using blogs as an academic tool just as it is used socially needs to be examined further in particular domains.

There have been studies on the use of academic blogs in different fields like Applied Linguistics, Life Sciences, Education & Physical Science based on different sources like hypotheses, Science Blogs, etc. stating that there have been disciplinary differences in engagement patterns. (Zou and Hyland, 2019) More reader mentions, directives, and questions are shown in soft disciplines, whereas, bloggers in sciences rely more on resources that claim relatively more author authority and require more shared understanding, engaging readers in a joint exploration of issues (Zou and Hyland, 2019). However, the study focuses on just 4 disciplines and these disciplines need to be further drilled down.

One of the blogs on Computer Science: 'Algorithms in the Real World' (Wilkins, 2008) has access to the historical data or versions of the different algorithms used. In this study, we aim to implement the historical feature. Science bloggers have the benefit to find jobs via their blogging. The North Carolina Science Blogging Conference (<http://www.scienceblogging.com>), held twice to date, has given an opportunity to isolate researchers who have come up via blogging as reported by 'Seed Magazine Science Blogs' (Wilkins, 2008)

In summary, there has been quantitative research on the use of blogs socially, politically and professionally as shown in Table 1. Relatively fewer blogs have been used in educational domains, highlighting the domain of Computer Science. In this paper, we will try to analyze the impact of blogging on the students from a Computer Science background in their academic life. We try to analyze the components of blogs that benefit in self reflection, skill sharing and

collaboration. In the next section, we describe our implementation.

3 IMPLEMENTATION

The design stage is an important step in the development process. It consists of specifications, and plans which pave the way for implementation. Figure 1 shows “Homepage” of blog, which is same for all the students and administrators. Everyone can see each other’s posts and comment on it for further interaction and collaboration. Navigation through the page is quite simple. There is the option to filter out posts with respect to “Most Viewed”, “Categories” and “Recent Posts”. In the next subsection, we discuss the activity diagram of the platform.

The activity diagram, fig 2, depicts the developed system and shows the dynamic features of the platform which facilitate interaction between students, and admins/tutors. Chief among these features is the reflection process, which is used to promote reflection-based learning. Ergo, after a post is created by a user, they receive feedback based on this post from tutors and thus make corrections. The administrators manage users, categories, and posts and can create, edit or delete any registered user, post, comment, and category. All the users are allowed to view each other’s post and comment on it. In the following diagram, student-1 is creating the post, and on the other hand, student-2 is viewing the created post. To the end that students can interact, collaborate, and thus improve their understanding of a given task.

4 MATERIALS AND METHODS

4.1 Participants

The blog was hosted online on 18th of February 2022 with the website ‘<https://www.awardspace.com/>’. So far, the responses gathered are from 30 participants, of which 77% of them are students. Approximately 20% of the participants are currently working on a collaborative academic project. Around 57% of participants have noted to have experience using collaborative tools in the past, which makes a significant impact on the analysis. Only a few demographics were gathered from the participants to respect their anonymity.

4.2 Materials

A questionnaire with a set of 30 questions was set up for collecting the feedback. Users were asked to

use the blog to provide honest feedback. The questionnaire had subjective questions based on the use of blogs with a 5-point Likert scale. The feedback for the various features and the UI of the blog was also considered while formulating these questions. Some categorical questions were also asked about the aspects of the blog and the kind of content one might prefer in comparison with traditional learning topics. Finally, in the end, the open-ended question was asked for suggestions and improvements.

4.3 Procedure

In this study of analyzing the benefit of using blogs as a collaborative tool, a blog was implemented with the profiles for two roles as described in the implementation section. The link to the blog was shared socially to extend the reach. The participants were asked to read the blog content and add new articles if desired. The participants had the option of creating an account for adding an article. Also, if they do not wish to create an account, they were asked to read and react to already posted blogs. The link to the questionnaire was shared along with the blog’s website link. The participants were encouraged to spend some time on the blog usage before filling out the questionnaire. The questionnaire was then analyzed further to answer our research questions.

5 RESULTS AND FEEDBACK

In this section, we present our quantitative results of the short study on the impact of using the blog. The blogs presented were articles related to Machine Learning and SQL, other than DBMS. To date, 26 responses were drawn, and the analysis is based on this small data.

The participants were asked to compare the blog to the traditional learning topics, and the responses had a quite non-uniform graph. In the bar chart, figure 3, we can see that amongst the topics given for options, 40% participants were in favor of ‘Computer Science’ and 45% participants preferred ‘Technology Update’. The participants, further referred to as students, made well use of the comments section to convey the remarks, as the section user’s identity is hidden. The students were encouraged to spend more time on the blog by adding multiple categories, and we could see in Figure 4 that around 50% of the participants lingered around for about 6-10 minutes. The students, who created articles, got feedback from the tutor/admin and also from the viewers in the format of the blog comments. The views of the blogs showed

Table 1: Summary of Literature Review and Relevance to Study.

Summary of Literature Review and Relevance to Study					
AUTHORS	METHODOLOGY	MERITS	ENGAGEMENT ANALYSIS	LIMITATIONS	CONTEXT
L. Giarre, et al (Giarre and Jaccheri, 2008)	Engagement based feedback system	User Stories based on three years of platform usage	Interviews and user stories	No measurable progress parameters	Blog
Wendy Freeman, et al (Freeman and Brett, 2012)	Content evaluation, usage frequency and feedback	Good indicators - Prompt use and blog content evaluation	Survey, content evaluation, timelines/frequency of entries	Surveys - highly unreliable	Blog
Keith Turvey, et al (Turvey and Hayler, 2017)	Content Analysis, post usage feedback and perceived improvement Documentation	Content analysis - good indicator of coherence and resonance	Survey, interview and quality of entries	Susceptible to anxiety, awkwardness and shame	Blog
Gihan Osman, et al (Osman and Koh, 2013)	Critical reflection and Kolb's cycle markers and Questionnaire	Four pillars of Kolb's learning cycle - good indicators of the learning process	Content analysis for quality	Short time(6 weeks) analysis of blogging practices	Blog
Begoña Montero-Fleta, et.al (Montero-Fleta and Pérez-Sabater, 2010)	Self reflection of content, comments and perceived improvement in skills	Descriptive and unique responses	Questionnaire, Interview	Only perceived improvement is recorded	Blog
Nianlong Luo, et.al (Luo et al., 2018)	Interpretation of organisational data by experts	Very scientific approach to testing hypotheses	Data of work times or login spans	No visible limitations except when employees are being dishonest	Blog(non-professional purpose)
Anupam Kumar Sharma, et.al (Sharma et al., 2021)	Authors and readers traffic - Measurement of change	Good indicator of effectiveness of a Platform - User statistics	User statistics	Short term changes in user traffic - misinterpretations and lead to false conclusions	Reward based blogging platform
Ekaterina Arshavskaya (Arshavskaya, 2017)	Effectiveness judged upon the factors of transformative learning theory	Methodology well suited for a case study	External observer reviews blogs	Qualitative method - outcome completely dependent on the person reviewing	Blogs a journal
Hee-Woong Kim, et.al (Kim et al., 2011)	Survey	Huge populations - very reliable	Questionnaires answered by the users of a blogging platform	Surveys sometimes not taken seriously	Blog
Olivia Halic, et.al (Halic et al., 2010)	Student made reports	Good way of measuring perceived progress or learning	Reports made after careful reflection	Self made reports - easy to manipulate and not quantitatively measured	Blog
Inae Kang, et.al (Kang et al., 2011)	Journal and report based qualitative analysis	Keen observation of test subjects by experts involved	Student journals and observation by researchers	Can not be measured quantitatively	Blog
Yi-Shun Wang, et.al (Wang et al., 2016)	Performance reviews and ratings in solving or completing problems or tasks	Study is semi quantitative - effective	Feedback from clients and user stories	Almost no limitations	Blog
Jie ChiYang, et.al (Yang et al., 2016)	Tests and surveys	Quantitative measurement using linear regression	Linear regression model of performance vs. Time spent online	Survey results sometimes be skewed and inaccurate	Blog
Mei-hui Liu (Liu, 2016)	Test group and control group split and analysis	Splitting of groups makes the experimental setup effective in testing hypotheses	Interviews of participants	Interviews only reflect ones perceived willingness/improvement	Vlog
Ahmad Zamri Mansor (Mansor, 2011)	Feedback based	First hand report of the experience via Feedback	Interviews and Questionnaires	Sometimes questionnaires can be annoying and lead to casual answers or replies	Blog as a learning journal

a high number in some blogs comparatively, which were shown in the 'Most viewed' section or, more interestingly, where comments were present (where the viewers want to review or ask a question). More than 50 percent of the participants claimed to have clarification of doubts or misconceptions due to the interactions.

Also, more than 80% of the participants showed interest in the collaborative work between team mem-

bers using the blog. One of the main feedback that we received from the participants was to include a sharing option for the article so that more people can view the content. Also, from the Usability inquiry, 75% of the participants agreed will be frequently used, and 87% indicated that it was easy to use. Furthermore, 83% indicated that they that it did not take long before they mastered different features of the platform, and 81% felt confident while using the platform. Over-

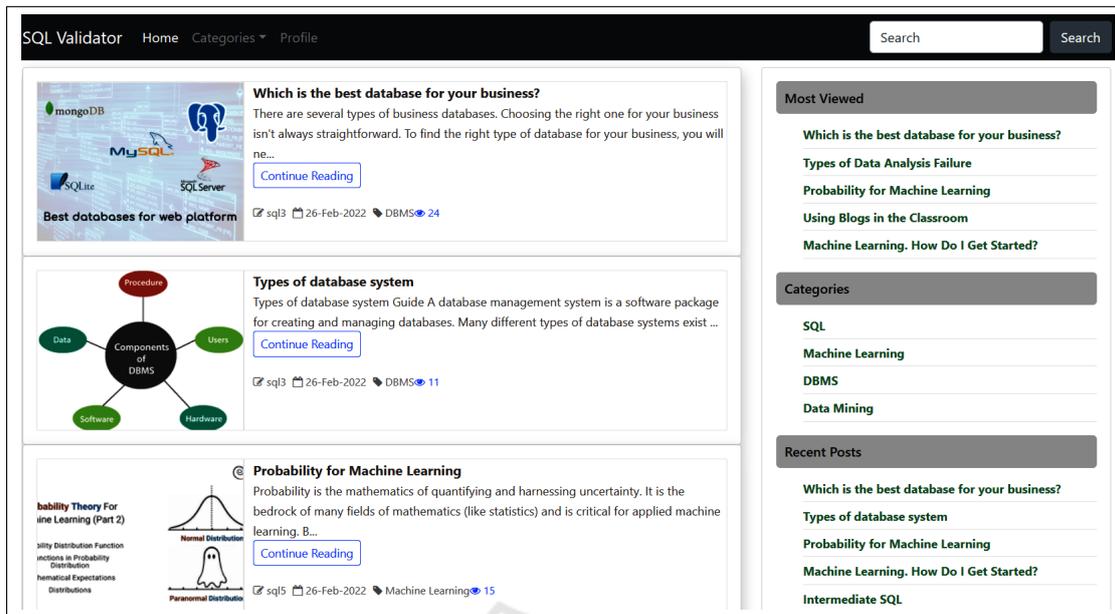


Figure 1: Blog Homepage.

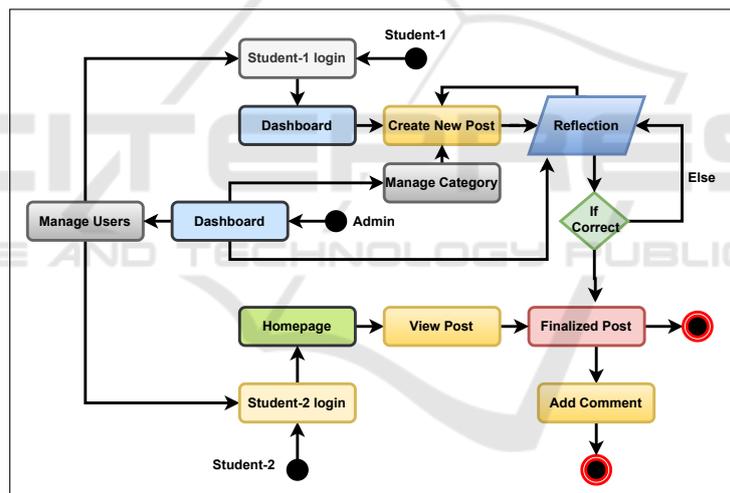


Figure 2: Activity Diagram.

all, feedback from users indicates that the use of our collaborative platform imposes a low cognitive burden, which is a requirement for user-centered environments. We also surveyed the suitability of our platform for collaboration, and 81.8% of the participants indicated in figure 6 that the blog environment was suitable for team collaboration and pedagogy. On the inquiry of the likelihood of posting a comment, 66.7% agreed that the likelihood of them posting comments was high, while a nearing equal amount of participants stated otherwise as depicted in 6. 81% of the participants further indicated that they felt a sense of community in the online platform during discussions, which is depicted in figure 6. Also, there was a

strong agreement among nearly two-thirds of the sample population that the blog environment is suitable for interaction in the real world. We further employed free text questions that inquired about the quality of content, and more than 80 percent of the participants reported that the content posted was relevant and helped them overcome misconceptions and got their doubts clarified. The participants have also reported an increase in productivity. On the free text questions on the benefits of frequently blogging about concepts they learned in courses of study, the participants reported that regular blogging could have positive impacts on different aspects of learning and communication, taking university courses into account. There

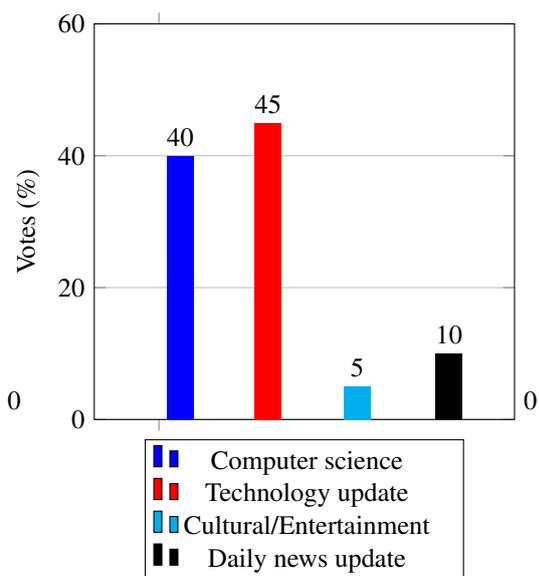


Figure 3: Blog content preferences.

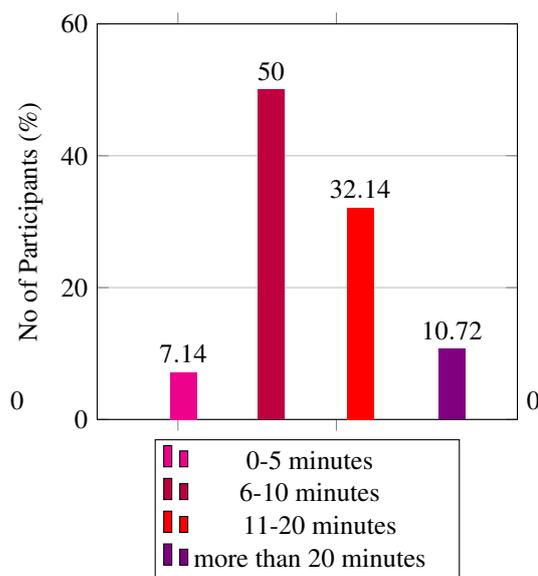


Figure 4: Time spent on blog.

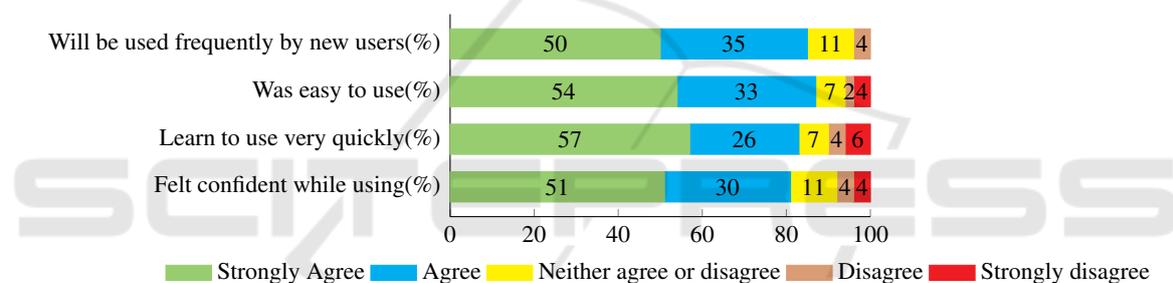


Figure 5: Usability Evaluation feedback.

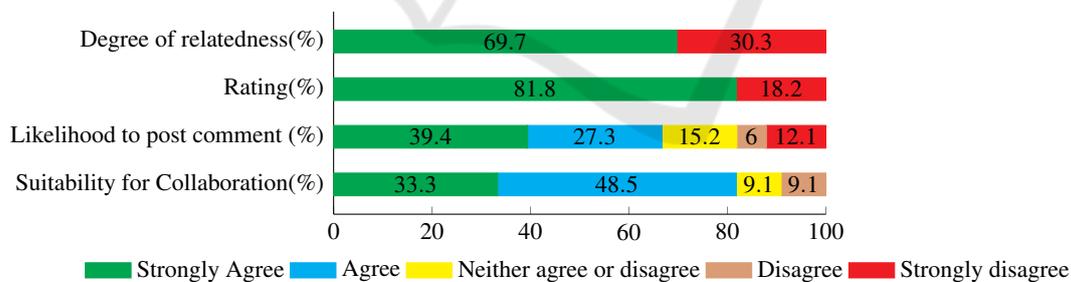


Figure 6: Percentage of participants.

was a consensus that the more students interacted with each other, the more possible, and easy, it was for them to solve course projects and exercises. Also, more than 75 percent of the participants reported that blogs had the potential to facilitate the expression of ideas. About 66 percent of the participants have reported that the blog has the potential to enhance teamwork. The participants have also reported that they are likely to come back to use the blog page after using it for the first time. Also, little more than two-thirds of

the participants have reported that they would prefer to use the blog for technical knowledge acquisition.

6 EVALUATION

To evaluate the performance of our environment of discourse, we have chosen the DeLone and McLean Information system success model (Petter et al., 2008). The model provides interrelated dimensions of

success, which is shortly discussed next. We have used these dimensions against the model designed by our team to evaluate the success. Since the D&M model takes into consideration the factors like system quality, information quality, service quality, (intention to) use, user satisfaction, and net benefits; we have tried to satisfy all the factors to our best efforts and for the user's best interests. Through our User surveys and feedback, we have concluded that our system:

- The blog page increases the productivity of the person using it.
- The sense of a classroom community with common interests is felt as well as strengthened by the use of this blog.
- A blog environment would be preferred most of the time when collaboration between the users defines the nature of work or task.
- A wide range of skills could be acquired from the usage of the blog.

7 SUMMARY AND FUTURE WORK

We presented a skill-sharing platform in SQLValidator (Obionwu et al., 2021), a web-based interactive tool for learning, collaborating. We assessed students participation and interaction with fellow students, team members and instructors. Our findings reveal high levels of participation from largely students, who spent an average of 6-8 minutes on each blog post related to their projects and courses. We also discussed other challenges encountered by participants while using the platform for collaborating and sharing the knowledge. Overall, it can be stated, based on the feedback we received, that blogging, when utilized for academic purposes, can aid in the development of critical and reflective thinking as well as the encouraging of team cooperation among students and between students and their instructors. Future work would include adding a multi-user editor for collaborative programming. We also plan to automate posts approval and the inclusion of video hosting capabilities.

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