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Self-Regulated Learning: MOOCs' Efficacy to Improve English Language Proficiency

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Original Article

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Keywords

MOOCs, STEM, self-regulated learning, language pedagogy

Abstract

Technology usage has been accelerating with the rapid innovations in language pedagogy to facilitate language learning, besides the availability and access to the online sources for language learning is also on increase. This study was conducted to better comprehend the effectiveness of massive open online courses (MOOCs) offered by Online Professional English Network (OPEN), USA, for the students of science, technology, engineering and mathematics. The chosen MOOC was English for Science, Technology, Engineering and Mathematics (STEM) and the sample comprised of 340 undergraduate university students. The English proficiency of the students was arbitrated by conducting pre and post-tests to recognize the usefulness of self-regulated language learning through MOOC. The results of the pre and post-tests were statistically analyzed by SPSS that revealed the worth of such language MOOCs in enhancing the English language proficiency. Moreover, an online survey was conducted from the same population so the participants can share their viewpoints about self-regulated language learning and most of them found English for STEM a stimulating and knowledgeable learning practice. The outcomes of this research are advantageous for English language teachers and syllabus designers to keep pace with the changing trends in language learning and teaching.

Introduction

The capability to effectively communicate in English has become a valued asset for STEM (Science, Technology, Engineering & Mathematics) students as the technology has been revolutionizing the way we access and disseminate information today. The prevalence of English as the dominant language for scientific and scholarly communication is one of the primary reasons for the mounting English proficiency in STEM online learning (Hillalliyati, 2022). The practice of using technology for language learning has become ubiquitous because of swift technological development in the recent years (Shadiev & Yang, 2020) which has encouraged the self-paced and self-regulated learning.

In this context, a massive open online course (MOOC) is defined as a free online course which is designed for a large number of the learners who are geographically and culturally dispersed. The benefits of MOOC include no entry requirement, globally recognized and flexible. It uses IT resources to facilitate the students and teachers worldwide (Min & Nasir, 2020). Additionally, the scalable nature of MOOCs empowers the institutions to offer online language courses to a massive number of learners concurrently, potentially reaching to thousands or even millions of learners worldwide. This scalability can lead the way to economies of scale by making language education more affordable and reachable to a wider population. The collaborative community-building features and user forums of MOOCs can also foster interactive learning besides permitting language learners to participate with their peers and instructors in a supportive and dynamic environment. In the realm of education, MOOCs have emerged with a transformative strength for the individuals globally, dispensing unprecedented access to knowledge and learning prospects (Conole, 2016). MOOCs propose unique characteristics by following the technology-enhanced learning approach that have the potential to revolutionize language education (Yousef *et al.,* 2015).

The online professional English network (OPEN) offers free MOOCs to limitless participants with variety of styles such as from self-paced to instructor-led. It provides virtual learning opportunities to English language teachers and students as well. OPEN encourages mutual exchange of culture while providing approach to teaching and learning material without any cost. The teaching and learning material can be reused, adapted and shared with others. It is sponsored by the U.S. Department of State where funding is provided by the U.S. government an administered by FHI 360 (OPEN, 2024). The courses are designed and developed by U.S. educational institutions and professionals in the field of Teaching English to the Speakers of Other Languages (TESOL). All these features make OPEN a magnificent learning platform for developing English proficiency globally.

The purpose of present research was to explore the effectiveness of MOOCs offered by OPEN, particularly English for STEM (Science, Technology, Engineering & Mathematics) because in today's globalized academic and professional landscape, the significance of English proficiency for the students of above-mentioned fields cannot be overstated. To fulfill this motive, following hypotheses were designed:

Null hypothesis: There is no significant difference between the scores of pre and post-tests of language proficiency by science, technology, engineering and mathematics' students who enrolled the MOOC, English for STEM, offered by OPEN.

Alternate hypothesis: There is significant difference between the scores of pre and post-tests of language proficiency by science, technology, engineering and mathematics' students who enrolled the MOOC, English for STEM, offered by OPEN.

This study also seeks to address the following research questions:

1) What are the effects of massive open online course (MOOC) offered by Online Professional English Network (OPEN), English for STEM, on the language proficiency of the students?

2) What are the students' perceptions regarding the usefulness of self-paced online language learning, specifically English for STEM?

3) How do science and technology students perceive the learning experience of English for STEM offered through MOOCs, in terms of stimulation and knowledge acquisition?

Literature Review

The role of English proficiency in today's digital age has become critical for students pursuing STEM (Science, Technology, Engineering, and Mathematics) fields, predominantly in the online learning context. Various studies have identified that the students face challenges in developing their English language skills and have emphasized the need for online language courses as English for STEM (Chand, 2021; Ozturk, 2021; Schietroma, 2019; Becerra, 2019; Maarouf, 2019; Ghulamuddin, 2022). Bourdieu's research has shown that English language is one of the most marketable skills in the workplace, especially in the setting of technological progression and the use of cloud-based services (Thorne & May, 2017). Likewise, Trimbron's research indicates that deficient proficiency of English can hamper an individual's progress within the organization so a robust command of English language is a decisive factor for organizational achievement (Anwer & Gill, 2020). Moreover, the swift advancement in information and communication technologies, chiefly the prevalent use of the internet, has made it imperative for STEM students to be proficient in English. Many of the state-of-the-art technological and scientific innovations, as well as educational resources, are primarily available in English, which can create barriers for students who lack adequate English skills. In response to these challenges, institutions and educators have recognized the importance of incorporating English for Specific Purposes (ESP) into STEM curricula, particularly in the online learning context (Anwer & Gill, 2020; Hillalliyati, 2022; Chand, 2021). The institutions can support STEM students by tailoring English language directions according to their specific requirements. This will enable them to develop the essential communicative competence to efficiently engage with course materials while participating in online language courses.

The concept of self-regulated language learning has gained significant attention in the field of second language acquisition especially in online learning's context, as it offers a comprehensive framework for understanding how learners can take an active role in their own language development. Self-regulation comprises of a multifaceted process where learners set their own learning goals, monitor their progress, and adjust their strategies accordingly to enhance their language proficiency (Cleary & Platten, 2013). Commonly, self-regulated learning refers to students' systematic attempts to control and direct their learning in order to meet precise learning objectives (Zimmerman & Schunk, 2011). In the past decades, self-regulated learning (SRL) has contributed significantly to educational psychology (Luo & Wang, 2023).

The emergence of MOOCs has provided new prospects for self-regulated language learning as these permit learners to take control of their learning by providing an extensive range of language-learning resources, flexibility, and personalized goal setting ability (Nakata, 2010, Manso-Vázquez & Nistal, 2015). One of the main advantages of MOOCs for language learning is their ability to reach global audience. By leveraging the power of the internet, MOOCs can surpass geographical borders and permit learners from diverse backgrounds to partake in language courses offered by institutions around the world. This global approachability uncovers a world of opportunities for individuals who may not have access to quality language instruction in their localities. Nevertheless, the success of SRL in the MOOC context is reliant on the learner's capability to effectively employ various self-regulatory tactics such as goal setting, time management, and help-seeking.

Numerous researches have been conducted exploring the various aspects of self-regulated learning and MOOCs. Bai & Wang (2023) investigated the interaction of motivational beliefs derived from divergent theories to forecast English language learning and SRL achievements among Hong Kong's primary school students. They found that growth mindset, self-efficacy and intrinsic values influenced self-regulated learning. Additionally, self-regulated learning was an important facilitating factor between motivational beliefs and English language learning attainments. Lastly, their research results indicated growth mindset as a strong forecaster of self-regulated learning and achievements as

compared to both self-effectiveness and intrinsic value. These results may emphasize the importance of comprehending motivational beliefs. Luo & Wang (2023) studied the connection between foreign language delight and boredom, SRL techniques and perceived usefulness of language MOOC. The learners who completed MOOC reported “a high level of enjoyment, moderate level of boredom as well as moderate levels of SRL strategies and perceived effectiveness”. Another study explored the self-regulated learning strategies among Chinese EFL students in technology usage context that revealed that MOOCs can be helpful in increasing the enjoyment ultimately affecting the outcomes of English language learning process (An *et al.*, 2021). Lee et al. (2020) examined the successful learners’ viewpoint about the usefulness of the Mountain 101 MOOC in relation to SRL strategies, task value and self-efficacy. While task value and SRL techniques were important predictors of successful learners’ perceptions of the MOOCs effectiveness, self-effectiveness did not. They highlighted the significance of the use of SRL techniques and task value beliefs of the learners that offer new perspectives on the issues of instructional design for MOOCs. Ceron et al. (2020) analyzed 66 studies such as conference articles and journal papers from renowned databases. They concluded that most scholars used quantitative approach followed by mixed method approach to study SRL. Mandasari (2020) found that online learning influences the academic performance of students in a positive way specifically it improves “learning motivation, learning achievement and learning engagement”. But, financial problems to afford the required devices and bad internet access can hinder online education. Albelbisi et. al (2020) developed a model by uniting self-regulated learning theory and DeLone and McLean success model (2003) to recognize the factors that influence the success in a language MOOC. This model proposed that satisfaction plays a critical role in assessing the success in a language MOOC along with self-regulated learning strategies. The findings of Min & Nasir (2020) directed that the usage of self-regulated learning in MOOCs can be affected by the professional context of the participants, program types for the learners and self-assurance. Additionally, setting goals and personal commitment are two highly endorsed SRL processes in improving learning outcomes as they support learners’ self-regulated learning. The students with self-regulated learning are more able to complete the course but they have little to do with how well they retained the material in MOOC. In both in-person and virtual learning circumstances, learners with greater SRL levels achieve better academically than those with lower SRL. Marsden et. al. (2018) synthesized self-paced reading in second language research by reviewing peer-reviewed journal articles about the use of self-paced reading. The findings of Kurucova et al. (2018) indicate that hybrid learning is more influential as compared to the traditional and e-learning modes. Further, the students’ score improved in the same way in all aspects. The vigilant preparation of online and classroom-bound portions of the course seems to be the decisive factor in effecting developments in the language skills and communication of Media Studies’ students.

The review of state of-the-art literature expresses the worth of using technology as well as self-regulated learning to cultivate learning in general and language learning in particular. It also reveals that most of the research in this arena deals with exploring the role of motivation and engagement in SRL along with reviewing past publications about online learning while less attention has been paid to analyze the success of learners before and after taking MOOCs which focuses the importance of the present study.

Methodology

The current study followed mixed research paradigm as it probes into the presented issue ‘Self-Regulated Learning: MOOCs’ Efficacy to Improve English Language Proficiency’ both quantitatively and qualitatively. The selected sample was 340 undergraduate students of University of Agriculture Faisalabad (UAF), a public sector university in Pakistan. Since the chosen MOOC was English for STEM offered by OPEN which has been specifically designed for the learners of science, technology,

engineering and mathematics so all the students belong to aforesaid fields. In Pakistan's government universities, the technological progress has not been promising because of neglecting higher education, insufficient resources and funding and lack of experts in this field however the situation is changing now. Another benefit of conducting research in public sector universities is access to the students from diverse geographical and economic backgrounds that may add to the authenticity of the concerned issue.

The data collection instrument for this research were pre and post-tests. These tests were conducted through Google Forms, to witness the efficacy of English for STEM offered by OPEN quantitatively. The reason for conducting tests online was to familiarize the learners with the use of technology in education as most of them were experiencing self-regulated learning through MOOC for the first time. Moreover, google form is accessible with no trouble to a large number of students and it is easy to cope with it even for the novice technology learners. The online test consisted of twenty multiple choice questions, appropriately covering the whole content of the selected MOOC. Some of these MCQs were included as it is from the quizzes contained within the MOOC while some were designed from the reading material provided in English for STEM, fulfilling the purpose of this research comprehensively. Then, paired samples t-test was conducted by using SPSS to statistically analyze and compare the score obtained from pre and post-tests. Paired sample t-test is the most appropriate statistical method when researchers aim to compare the mean scores of two paired or related groups such as pre and post-tests' scores (Xu *et al.,* 2017). This test has been designed to analyze the difference between two measurements obtained from the same individuals under two changed circumstances (Alnory et al., 2018). Furthermore, an online survey was conducted at the completion of the course for perceiving the students' viewpoint about online language learning specifically the learning from MOOC, English for STEM. During this online English language course, the discussion sessions of researcher with the students were also beneficial in resolving their relevant issues along with analyzing their performance because most of the students were experiencing such kind of language learning for the first time.

Data Analysis and Results

This section presents the comparison of students' mean scores between pre and post-tests conducted before starting and after completing the MOOC, English for STEM. In the online MCQs test, each correct response scored 1 while the incorrect response scored 0, thus the maximum possible score was 20. Paired sample t-test was applied through SPSS to compare the mean score of 340 undergraduate university students. The results are presented in tabulated form below:

Table 1: *Paired sample t-test analysis*

	N	Mean	SD	t	df	p-value	Sign.
Pair 1: pre-test score	340	14.81	3.113	-6.80	339	.001	0.05
Pair 1: post-test score	340	16.46	3.145				

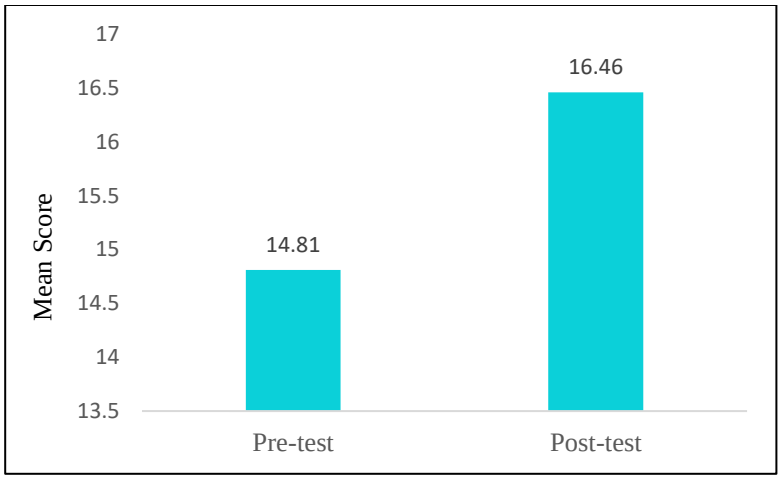

Figure 1: *Comparison of mean score between pre-test and post-test*

It is evident from table 1 that the mean score of the pre-test (M=14.81) and post-test (16.46) were significantly different. Further, t= -6.80 that provides p-value or 2-tailed significance value .001which is lesser than the standard significant value 0.05. Therefore, it provides adequate statistical evidence to reject the null hypothesis (H0) that there is no significant difference between the mean scores of pre and post-tests of language proficiency by science, technology, engineering and mathematics' students who enrolled the MOOC, English for STEM, offered by OPEN. Figure1 also confirms the statistical analysis visually to reject null hypothesis and accept alternate hypothesis (H1) which depicted significant difference in the mean score of the students between pre and post-tests. Moreover, the standard deviations of both pre-test (3.11) and post-test (3.14) are approximately same which propose comparable variability in the language learning of the students before and after completing MOOC.

The below given table presents the percentage response of the current research's selected sample to each question of online survey conducted after the completion of English for STEM.

Table 2: *Questions/statements and percentage response of online survey*

Statement/Question	% age Response	
Residential area of the student	Rural area 41.8%	Urban area 58.8%
Have you ever experienced any online course before? (may not be related to language)	Yes 40.6%	No 59.4%
How did you find this self-regulated online mode of language learning?	Convenient and Flexible 95.7%	Inconvenient and Rigid 4.3%
Which mode of learning do you prefer for language development?	Physical classes 67.4%	Online/Hybrid mode 32.5%
You found English for STEM useful to improve: (grammar, vocabulary, reading comprehension, information in the reading material)	All of these 98%	None of these 2%
In your point of view, language learning is more effective:	with teacher 98.8%	without teacher 1.2%
Such MOOCs should be a compulsory part of syllabus for cultivating English language proficiency.	Yes 86.5%	No 13.5%

Discussion

This research aims to investigate the difference in English language proficiency of undergraduate university learners through the MOOC, English for STEM. For satisfying this purpose, paired sample t-test was conducted to analyze the data quantitatively. Table 1 provided appropriate statistical reason to reject the null hypotheses while accepting alternate hypothesis which states significant difference between the scores of pre and post-tests of science, technology, engineering and mathematics' students who enrolled the MOOC, English for STEM, offered by OPEN. The increase in the post test mean score of the students authenticates the improvement in the English proficiency of the students. The response in online survey further validated its usefulness since 98% students felt improvement in their grammar, vocabulary and reading comprehension after completing English for STEM.

The students were guided by the researcher before starting the online course about enrollment in MOOC, strategies to increase reading speed along with improving comprehension, dealing with various issues while using CANVAS and going through the content of the course. This guidance was imperative because 59.4% students never experienced self-regulated language learning before. Moreover, the students with rural background and even many of those who are living in cities have no exposure of online language learning because of unawareness, lack of resources and poor internet facilities. The classroom discussion during this course revealed that around 40% students were unable to handle technology related problems and completing the activities of MOOC so they found this mode of learning interesting as they felt they are gaining practical knowledge. In addition, 98% students feel the involvement of teacher in language learning, whether physical or online, more satisfactory. Another reason of these hindrances may be more use of mobile phone for the online course as compared to laptops because it was not possible for all of them to have a laptop. Although the students confronted some issues but still 95.7% students found this mode of language learning convenient and flexible which highlights the effectiveness of MOOCs. Even though, a large proportion considered MOOCs convenient and effective but 67.4% of them preferred physical classes instead of online or hybrid mode. They found classroom language learning more influential as they comprehend the content well. A likely clarification can be the dominance of classroom learning mode in the primary and secondary education in Pakistan as the students are accustomed at it (Darkwa & Antwi, 2021). Here, the role of teachers and syllabus designers is crucial to maintain a balance between synchronous and asynchronous learning because both modes are significant in the present technological era. Where asynchronous learning highlights liberation and self- regulation there synchronous learning features discussion, instant feedback and collaboration (Lee, 2024). The educators can bring innovations in the contents of English language syllabus, teaching strategies and classroom activities to acquaint the students with the changing trends in language pedagogy and prepare them for their future as 86.5% of them supported the inclusion of MOOCs as compulsory component in English language syllabus.

In online survey, the students were requested to provide their feedback or suggestions regarding self-regulated language learning and the MOOC, English for STEM. Most of them responded positively, considering it an effective way of improving English proficiency specifically for the students of science, technology and mathematics. The mentioned reasons were specialized vocabulary, interactive activities, up-to-date content, convenience and flexibility. But they found the spoken practice missing. The feedback of the students can assist English language teachers in deciding to practice the already designed MOOCs without any change or adapting them accordingly.

Conclusion

The current study revealed significant difference in English proficiency of the undergraduate university students after completing MOOC, English for STEM, offered by OPEN, that emphasized the effectiveness of online language learning. Keeping in view, the technological revolution in each sphere of life it is crucial to familiarize the students with innovative ways of improving English language

independently. The results emphasized the involvement of teacher in self-regulated learning as students feel the language learning process more satisfactory in this way. The possible reason may be the traditional classroom based primary and secondary education system of Pakistan. The technological infrastructure is available at tertiary level in Pakistan contemporarily but it is non-existent at the beginning levels especially in public sector educational institutes, also the trained English language teachers are few. So, this research suggests the gradual shift in teaching and learning strategies at all levels to meet the requirement of the upcoming times.

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