Community in the Open:

Supports, Challenges, and Impacts of Local Learning Communities of K-12 Adolescent MOOC Learners from Nepal

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Abstract

This exploratory qualitative study investigates the obstacles, local support, and learning outcomes for adolescent learners in Nepal taking massive open online courses (MOOCs). A convenience sampling method was employed, and a total of thirteen individual interviews were conducted with K-12 Nepali students. Utilizing thematic analysis, this study revealed that the major difficulties these learners faced were a lack of scaffolding, language barriers, limited technology and internet access, and unmatched learning capacity and MOOC learning objectives that were designed for adults originally. To address these challenges, a local community of teachers, peers, schools, and families played a significant role in inspiring learning, providing scaffolding and guidance, fostering a collective and open local learning environment, instilling motivation, and offering both emotional and technical support. MOOC learning increases the independence of these adolescent learners, supplementing school learning, supporting their career paths, providing practical skills beyond theories, and achieving mental well-being. The aim of this study is to address the existing research gap pertaining to the role of local

communities in blended learning with MOOCs, especially within communities situated in the Global South.

Keywords: Massive open online courses (MOOCs), local community, K-12 learners, blended learning, Global South

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During the COVID-19 pandemic, while efforts were made to transition society into the digital learning age, massive open online courses (MOOCs) have been significant resources for learners to access rich learning materials and engage in diverse learning activities with esteemed professors and leading experts in various fields (Alamri, 2022). When first enacted, MOOCs were designed to provide unrestricted access to a large number of students in an online learning environment (Deng et al., 2019; Guggemos et al., 2022). Though MOOCs were initially designed for adult learners who can take classes for free and potentially receive certificates upon completion of the course, instead of receiving college credits (Impey & Formanek, 2021), there are also a growing number of K-12 students participating in MOOCs (Guo & Reinecke, 2014; Stoltzfus, Scragg, & Tressler, 2015). However, the majority of MOOCs are currently still geared toward adult learners, which frequently fail to align with the needs of K-12 students (Koutsakas et al., 2020). As a result, there is an urgent need to study how K-12 learners engage in MOOC learning (Guggemos et al., 2022).

Ghimire (2018) reported the phenomenon that thousands of high school students in Nepal had completed at least one MOOC. Ghimire and Gautam (2020) further suggested that some MOOC completers in Nepal share their learning experiences with more people in their local community as well as other nearby communities by facilitating workshops that include presenting and sharing materials. Existing studies gave heavy attention to the social and collaborative aspects of online MOOC communities (e.g., Antonaci et al., 2019; Crane & Comley, 2021; Ruipérez-Valiente et al., 2021), blended learning (e.g., Bralić & Divjak, 2018; Bruff et al., 2013; de Moura et al., 2021), and localization in terms of content and design (e.g., Che et al., 2016; Godwin-Jones, 2014; Liu et al., 2020); however, there is scarce research on how local learning communities are formed as a result of MOOCs. In fact, many studies suggest that social connections significantly impact students' attitudes and overall engagement in MOOCs and other forms of online learning experiences. Notably, the lack of social interactions and feelings of isolation have been among the major reasons for dropping out of MOOCs (Gamage & Whitting, 2021; Wang et al., 2019.)

This study was designed in response to the unique MOOC learning context described in Ghimire and Gautam (2020), wherein hundreds of Nepali adolescents earned certificates of English via MOOCs prior to the pandemic. The present study explores the specific phenomenon of Nepali adolescent learners expanding local learning communities beyond MOOC learning. There are three questions that guided this research:

1. What difficulties and challenges do Nepali adolescent learners face when learning with MOOCs?
2. What types of local resources are available and beneficial to Nepali adolescents to facilitate their MOOC learning?

3. What are the learning outcomes and impact of Nepali adolescent learners taking MOOCs?

Literature Review

Blended Learning with MOOCs

Blended learning is commonly known as an approach that integrates the advantages of face-to-face and online learning components (Rasheed et al., 2020). Blended, hybrid, mixed-mode, and flexible learning are frequently used interchangeably (Müller & Mildenberger, 2021). There has been a growing research interest in how MOOCs can be integrated into face-to-face higher education classrooms for possible blended learning experiences (Albó & Hernández-Leo, 2020; Alghamdi et al., 2019; Bruff et al., 2013).

A blended approach is commonly used when MOOCs are used in K-12 education, because their implementation has to coincide with pedagogical methods that best fit the learning experiences, capabilities, expectations, and needs of K–12 students (Briggs & Crompton, 2016; Koutsakas et al., 2020).

MOOCs in K-12 Education

Research on MOOCs has been centered around postsecondary education. In fact, before 2013, there was a complete absence of literature on MOOCs in the K-12 context (Yin et al., 2015). Graham et al. (2014) suggested that open learning practices in K-12 situations are often structured and monitored by teachers due to the nature of the K-12 environment, which is highly controlled by curricula and policy in the educational system. Such a unique context makes open learning integration in K-12 much harder than it is in the adult learning environment.

Panyajamorn et al. (2016) studied the effectiveness of the MOOCs hybrid learning model among 182 rural school students from grades 7-9. That study took place in Thailand and also utilized a quantitative method of pre- and post-test with students' satisfaction questionnaires to examine how students' learning is influenced by a proposed MOOCs hybrid model, which used a chemistry MOOC designed for adult learners to combine with a flipped learning approach. Study results suggested the model is effective in improving learning for all ages, even with students who lack significant e-learning experience.

Research on how MOOCs that are designed for adult learners are implemented in K-12 settings is extremely limited. Not surprisingly, there are more studies available on MOOCs that are specifically designed for K-12 learners. Koutsakas et al. (2020) conducted a qualitative narrative systematic review of K-12 MOOCs that covered the literature published between the years 2013–2020. They only identified 21 studies on K-12 MOOCs. Of those, 16 of them were about MOOCs that were specifically designed for K-12 audiences, and five were not. Notably,

three different ways to integrate MOOCs into current K-12 infrastructures were recognized, namely, serving: (a) as a preparation for advanced placement AP towards higher education, (b) as supplementary to the school curriculum, or (c) as extracurricular activities. This systematic review claimed that the existing literature on K–12 MOOC implementations demonstrated positive effects for both teachers and students. The presence of teachers as well as social interaction and guided learning in a blended learning setting were found to be particularly critical components that contribute to the success of K-12 MOOC learning.

Research on MOOC implementation in the K-12 education context is still limited (Guggemos et al., 2022; Koutsakas et al., 2020). There is a need for future research to discover potential opportunities, benefits, risks, uses, and practical values of using MOOCs in K–12 educational settings (Yin et al., 2015).

Local Learning Communities and MOOCs

Siemens and Downes (2005, 2009) proposed the Connectivism theory to explain how learning occurs in some types of MOOCs. Connectivism posits learning as a social process within a group setting. Siemens and Downes advocated for a shift in educational courses from closed, highly structured formats to open networks fostering self-directed learners, aligning with the dynamics of the digital learning age. Similarly, Cormier (2008), another early advocate of connectivistic types of MOOCs, stressed the collaborative construction and real-time negotiation of the curriculum through active engagement, highlighting the significance of learner social participation in the learning process.

MOOC learners often struggle with isolation and disconnection from other learners; therefore, cultivating peer interactions and creating a sense of belonging can be critical in cultivating a community of practice (Gamage & Whitting, 2021). A community of practice (CoP) is a community of individuals who share a common concern or enthusiasm for what they do and collaborate regularly to learn to do it better through interactions (Wenger, 2011). According to Wenger (1998), "We all belong to communities of practice. At home, at work, at school, in our hobbies—we belong to several communities of practice at any given time. In fact, communities of practice are everywhere" (p. 6).

Some studies suggested that learning from MOOCs in collective groups would result in better learning outcomes and also assist students in overcoming challenges, such as a lack of motivation as well as issues around understanding the topics (Firmansyah & Timmi, 2016). Li et al. (2014) studied 54 engineering students watching MOOC video lectures and collaboratively working together on quizzes. Their study reported high satisfaction in studying within groups because learners gained a sense of connection and interaction.

Interestingly, Firmansyah and Timmis's (2016) study suggested that fostering on-site collaborative learning in local communities is particularly significant for MOOC learners whose

primary spoken language is not English. Such on-site learning can help them more effectively learn from MOOCs such as by making their MOOC learning relevant to the local context. Therefore, additional research which investigates approaches to forming and maintaining local learning communities is critical for a better understanding of K-12 MOOC learners' adaptations, collaborations, and overall successes.

Challenges in MOOC Learning

Mendoza et al. (2017) classified three major barriers to adopting MOOCs into various learning contexts, namely, environmental, personal, and design. The environmental barrier is shared with all forms of online learning, such as unstable network infrastructure (Mendoza et al., 2017). More specifically, Ma and Lee (2019) pointed out that internet and technology access caused a usage challenge for MOOC students, especially for those in developing countries. Second, personal barriers are those related to personal variables, such as individual learning styles, learning capacity, and anxiety levels (Mendoza et al., 2017). In addition, de Waard et al. (2014) suggested that language issues, low self-esteem, lack of previous knowledge, and limited ability to operate technology may restrict people from actively participating in learning from MOOCs. It is plausible that using virtual communities with physical learning communities may support learners from these vulnerable groups to be more engaged. Third, design barriers, such as a lack of learning support or clear information, can cause more challenges for MOOC learners (Mendoza et al., 2017). Yilmaz et al. (2022) suggested that because MOOCs are structured for a massive audience and often lack personalized learning features, students in MOOCs often need scaffolding support, especially for courses requiring problem-solving skills rather than just memorization and learning from lectures.

In summary, integrating MOOCs into K-12 learning presents a distinctive challenge due to the highly structured nature of K-12 education. To address the isolation experienced by MOOC learners, local learning communities are necessary. These communities facilitate peer interactions and a sense of belonging. Collaborative learning within local communities, particularly for non-English speaking MOOC participants, emerges as a valuable approach to enhancing the pertinence of MOOC learning within local educational contexts.

Method

This study used a qualitative exploratory interview research approach, which does not seek confirmation of theories but rather discover a little-known area (Swedberg, 2020). This type of research requires researchers to maintain a flexible and curious attitude to collect information while seeking clues to reveal what is happening (Stevens & Wrenn, 2013). Therefore, when employing a qualitative exploratory interview approach, researchers should be capable of following up with questions towards unanticipated answers and be willing to investigate information that deviates from the original interview protocols. All the researchers conducting

interviews for this study were experienced in interviewing and comfortable asking follow-up questions, thus maintaining a natural conversational flow. To ensure consistency in the interview process, one researcher led all the interviews, while one or two additional researchers facilitated the process.

Individual interviews were conducted with thirteen adolescent MOOC learners in Nepal to explore their MOOC experiences and local community engagement in their MOOC learning. The interviews were semi-structured, which allowed for open-ended responses and a natural flow of conversation. For example, for the purpose of gathering data related to students' engagement with diverse learning resources and support, a set of questions was employed, such as:

1) Do you share your MOOC learnings with others (e.g., classmates, friends)? If so, in what manner? If not, what are the reasons for refraining from sharing?'
2) What do your parents feel about you taking all these MOOCs? Did any specific MOOC that you took or passed impress them? If yes, which ones and why?
3) Have your teachers provided support in your MOOC learning experience? If so, in what ways?

Each interview lasted approximately 60 minutes and was video-recorded through Zoom and auto-transcribed through Kaltura. The auto-transcripts were reviewed and corrected by the researchers in a verbatim approach.

Participants

In this study, a convenience sampling method was employed for participant recruitment. Participants were recruited through a Nepali high school teacher who toured many different schools and communities in Nepal to promote MOOCs. Importantly, he assisted in the distribution of interview information to students in various regions of Nepal. His criteria for selecting participants included the following: students who had taken quality MOOCs, were capable of effectively communicating in basic English with researchers, demonstrated approachability based on pre-established connections, and were located in widespread geographic locations in Nepal. Additionally, he provides us with information about the students' English proficiency levels.

As depicted in Table 1, it is evident that the students possessed at least a B1 English level according to the Common European Framework of Reference for Languages (CEFR). This classification signifies that the students were intermediate English learners, capable of describing experiences and expressing opinions effectively in a wide range of situations. This information provides assurance that interviews could be effectively conducted in the English language. Furthermore, it is worth noting that one of the researchers on our team had established prior connections with certain participants through their involvement in an educational podcast show. Consequently, this pre-existing relationship afforded our team valuable insights into the typical

English-speaking competency and background knowledge of these participants. Moreover, all members of our research team possessed extensive experience in conducting international research. This experience equipped us with the capability to effectively communicate and elucidate concepts with English learners while also being cognizant of potential cultural and linguistic disparities. Eventually, 13 students agreed to participate in interviews, and their ages ranged from 12 to 18 years old. Detailed demographic information can be found in Table 1.

Table 1

Interviewees' Demographics from Li et al. (2023). Copyright permissions have been obtained.

Interviewees	**Gender**	**Age**	**Location**	**School**	**English level**	**Age started taking MOOCs**	**# of MOOCs completed**
Aange	M	18	Gulmi	Resunga Secondary School	B2	13	More than 50
Binsa	F	16	Pokhara	Motherland Secondary School	C1	14	23
Chaha	F	17	Pokhara	Motherland Secondary School	C1	13	Around 50
Daxa	F	13	Kirtipur	Creative Academy	B2	11	12
Ehani	F	14	Kirtipur	Creative Academy	B2	11	15
Faneel	M	17	Syangja	Ranbir Janahit Secondary School	B1	13	120
Geetu	F	16	Pokhara	Motherland Secondary School	C1	13	More than 40
Hartaj	M	14	Kirtipur	Creative Academy	B2	13	21
Imay	M	17	Syangja	Ranbir Janahit Secondary School	B1	13	Around 50
Juddha	M	15	Kirtipur	Creative Academy	B2	12	9
Nugah	M	14	Kirtipur	Creative Academy	B2	12	21
Saudis	M	17	Nawalparasi	Janata Secondary School	B1	14	Around 90
Palisha	F	16	Kailali	Gurukul Academy	C1	11	75

In accordance with IRB guidelines and ethical considerations, we could not collect or publicize sensitive socio-economic information from participants. However, the local teacher provided us with certain contextual information. He mentioned that the 13 interviewees come from varied socio-economic backgrounds, including three from urban areas, four from semi-urban areas, and six from rural areas. Additionally, only four out of the 13 students have a guardian who has earned a university degree.

As part of an extensive study investigating the learning approaches of Nepalese adolescents in the context of MOOCs, our findings indicate that approximately half of the participants (n=6) set their learning goals with a focus on personal growth (Li et al., 2023). Additionally, nearly all of the participants (n=12) were highly motivated by their inherent curiosity for learning, although obtaining certificates from MOOCs was identified as a crucial motivating factor by 11 participants. Self-monitoring was highlighted as a significant aspect of the learning process by six interviewees. Hence, they actively tracked their learning progress, set reminders for their MOOCs studies, and recorded their learning experiences in notebooks or diaries. Information regarding students' approaches to learning in MOOCs was initially extracted from interview recordings and subsequently validated through follow-up email responses. Details are summarized and reported in Table 2.

Table 2

Students' Approaches to Learning in MOOCs—Extracted from Interview Recordings and Follow-up Email Responses

Interviewees	**External motivation (e.g., certificates)**	**Internal motivation (e.g., curiosity, self-growth)**	**Goal setting**	**Time management (e.g., set schedule for MOOCs)**	**Seek material resources to complement MOOC learning (e.g., YouTube)**	**Seek support from the local community**	**Evaluate learning**
Aange	✓	✓	✓	✓	✓	✓	
Binsa	✓	✓	✓	✓	✓	✓	✓
Chaha	✓	✓	✓	✓		✓	✓
Daxa	✓	✓		✓	✓	✓	✓
Ehani	✓	✓	✓	✓	✓	✓	✓
Faneel	✓	✓		✓	✓	✓	
Geetu	✓	✓		✓		✓	✓
Hartaj	✓	✓		✓		✓	✓
Imay		✓		✓	✓	✓	
Juddha	✓	✓			✓	✓	✓
Nugah	✓	✓	✓	✓		✓	
Saudis	✓	✓		✓	✓	✓	
Palisha	✓	✓	✓	✓	✓	✓	✓

Data Analysis

Thematic analysis was used for data analysis (Braun & Clarke, 2012; Terry et al., 2017). Data was coded through Nvivo 12. To enhance the validity of qualitative coding through triangulation, two of us coded the transcripts and conducted a comparative analysis of their coding outcomes. At first, we organized the raw data for analysis by correcting the interview transcript. We independently employed an inductive open coding approach to code three transcripts, which involved assigning codes to segments of data based on themes. After independently coding three transcripts, we noticed discrepancies in their coding. In a subsequent meeting, we discussed these differences to reach a consensus on the initial codebook categories. For example, one of us used the code "transform into practical meaning" for instances where participants mentioned applying knowledge from MOOCs to hands-on practice, while another used "life changing" for similar instances. During the discussion, we shared our interpretations of these codes for segments related to transferring knowledge to hands-on practice. We realized that both codes essentially captured the same theme but used different terminology. To resolve this, we engaged in a dialogue, reached an agreement, and modified the theme to "provide practical skills beyond theories." Subsequently, we updated our coding scheme to include this agreed-upon code, ensuring consistency in our analysis. Then, to ensure the consistency of coding and the trustworthiness of the study, one of us coded the rest of the transcript alone, and the other reviewed and confirmed the final code.

In the initial coding phase, we assigned specific codes to segments of data, identifying recurring patterns, concepts, and ideas. This step constitutes the foundational level of coding to create codebook categories. Subsequently, we organized these categories into sub-themes, where related codes with commonalities were grouped into clusters. This represents an intermediate level of abstraction, allowing for a more focused analysis. Finally, at the highest level of abstraction, themes were derived by synthesizing and interpreting the sub-themes. The themes and sub-themes are presented in Table 3.

Table 3

Themes and Sub-Themes

Themes	**Sub-themes**
Struggle and challenges	Access to technology. Base-language of the courses is difficult. Course design. Need guidance. Unmatched levels.
Teacher support	Inspire initial engagement in MOOCs. Provide scaffolding and guidance. Offer emotional support.
Peer support	Discuss content questions.

	Provide advice on what classes to enroll in. Support the financial application process. Resolve technical issues. Expand local learning community.
School support	Post students' certificates from MOOCs on social media. Offer small incentives. Organize guided workshops and presentations on MOOCs. Offer access to technology and the internet.
Family support	Provide internet and technology support. Provide emotional support. Inspire family members to learn new things.
Learning outcomes and impacts	Improve independence and time-management skills. Supplement in-school learning. Support career path selection. Provide practical skills beyond theories. Achieve mental well-being.

Findings

Struggle and Challenges

The most reported challenge by eight of the 13 interviewees is that they lacked guidance on how to operate these MOOC websites in the beginning, so they were often lost. For example, Chaha mentioned the difficulty for an adolescent learner to figure out how to navigate the basic features like creating an account as well as logging in and out on platforms like Coursera. Chaha stated,

> When we applied for the first time for online courses, [sic] I was pretty much confused because since it seems we weren't [sic] training for it and most of the things were pretty complex, so it was for us like how to log in how to log out. Because of those problems, even my friends, they tend to [lose] their interest in MOOCing but I continued.

Ehani also mentioned that even though her teacher introduced MOOCs to them initially, she was not fully aware of what she was supposed to do. As she described, "Firstly, when we were using MOOCs, we didn't have much idea [on] what should we be doing, when we started doing [MOOCs]."

Another major challenge reported by six participants was the language barrier. The base language of these major MOOC platforms was English, which was not the first language for these Nepali adolescent learners. Daxa admitted, "I couldn't understand everything being said." Hartaj also mentioned that certain MOOCs instructors employed English in a manner that exceeded the scope of what they had learned in Nepalese schools, such as using specific

terminology or slang, posing challenges for adolescent learners to fully understand the content. He observed, "What some people speak English, it was a little difficult for me to understand the English that they were speaking of some speakers in the video." Saudis provided more context that, "MOOCs was very challenging for me because I'm from a public school to know English is very, very basic for us." However, for certain MOOCs that heavily relied on videos, the inclusion of captioned video content could be beneficial. Nugah claimed that "[when I] listen to those native speakers that they speak quite fast. I couldn't get them at all. I need the subtitle."

Five interviewees discussed limited access to digital devices (e.g., computers, smartphones, etc.) and the internet restricted their learning from MOOCs. Aange genuinely stated, "There was no internet connection to us, and there were no computer resources to us, and it was at that time in 2017, 2018, we were not able to join those courses." Even though the school labs may provide some devices, the demands for devices to take MOOCs often exceed the supplies available in school. As Aange explained,

> We used to have six computers in our class, [but including] I with my friends, [there] were more than 20 [students] in the class, so we need to manage six at one time to take those MOOC courses. And in the beginning, everyone was fully interested in taking those courses, and then we used to have a time limit of 20 minutes or 30 minutes to do those courses, and if one doesn't feel finished in this time gap, then the other friend used to come, and there used to be a kind of you can say quarrelsome time.

Four interviewees also mentioned that because MOOCs were not designed for adolescent learners at their ages, some of the courses were too advanced and difficult for them. Juddha gave one example,

> I remember one of our friends was [sic] enrolled in a course that was not meant for us either, so it was a course that was for the level of bachelor's. And so those courses we [sic] skipped pass the course, because we are not able to understand it, and it does not allow everyone to understand it either.

In summary, the major struggles and challenges that these Nepali adolescent learners experienced include a lack of guidance to start MOOCs, language barriers, unmatched levels between their ability and MOOC content, and limited access to technology.

Local Resources and Support

Teacher support

All thirteen participants claimed that local resources and support are crucial in their learning experience with MOOCs, particularly teacher support. All the participants were inspired

and encouraged by their schoolteachers to start their MOOC journeys, and teachers provided scaffolding and emotional support along with their learning. For example, Ehani stated, "Firstly, when [my teachers] introduced about Coursera they encouraged us to get involved in one of the easiest courses first try from easy then we'll get to learn new things again and again." Palisha also mentioned that her teacher forwarded her a link to a list of 75 free MOOCs and so it served as a guide that directed her to complete these courses before she explored MOOCs on her own. In addition, Binsa noted that her teacher encouraged her to do MOOCs as COVID-19 impacted education across the world, and they needed alternative ways to keep learning. She explained that,

> My English teacher introduced me to MOOCs. It was kind of obvious that we were going to [get] into a lockdown after our 9th-grade class ended, and so my English teacher called me and told me everything [about] how I could engage [in] MOOCs, and why it was important, and what you can get through it, how you can learn. And he really encouraged me and he kept asking how many MOOCs have you completed, and he [reacted] to my stories [on social media] about the certificates, and he recommended me [of] some courses and asked me how my journey in MOOCs was going.

Apparently, teacher support plays a pivotal role in initiating MOOC learning on a large scale, guiding students through difficulties that they experienced in their learning process, and providing emotional support in this specific Nepali local community.

Peer support

Twelve of the thirteen interviewees reported their experience either supporting or being supported by their local friends in their MOOC learning experiences. Peer support is efficient in discussing content questions in MOOCs, providing advice on what classes to enroll in, supporting the financial application process, resolving technical issues, and expanding this local learning community, which can be achieved through in-school activities, personal connections, and social media. For example, Palisha mentioned in the following quote that her local friends have study groups to support each other in solving questions regarding the content. She explained that,

> Actually, we had a study group of my friends in which we used to share really like doing the same courses, and sometimes someone was having problems with some quizzes or some [of] the tasks given by the current courses, so we used to help each other in that so we had those [sic] [questions correct].

Hartaj also used friends as resources to help her make decisions on which course to take. As he put it, "We have a group of friends who were taking these courses they suggested me to

take this course, as they told me that it was really fun so I took it." Likewise, Geetu described how she and her friends would suggest interesting courses to each other. As Geetu stated,

> When I take a MOOC, I also inform about it to my friends, and if they are interested, they also take those MOOCs. And when my friends I've been with, they also informed me that they are doing such courses, and then, if I'm interested in that I also think [about taking] that [course].

Aange even suggested that having a peer who is experienced in MOOCs learning can significantly contribute to their learning experience. He noted that it was common to make mistakes when taking MOOCs. Whether it's during logging in, handling financial aid, or other things, mistakes can lead to trouble. So he suggested it's a good idea to keep someone in touch who can guide them through these situations. As the following quote details,

> The last thing I would suggest to the beginners is if you just keep someone who is experienced or if he or she knows something about MOOCs previously, then keep someone in contact, so that you can ask for someone, because in many of the cases, while doing more courses, we do it, and we just make mistakes, while being those things, why even why logging in, not even by logging in and to from financial aid. And many more things we may have made mistakes and we may have fallen into trouble. So you can just keep someone in touch.

All these interviewees mentioned that social media and other technology have been incorporated into sharing and facilitating MOOC learning, which even leads to an expansion of the learning community. For example, Binsa described her MOOC sharing process as follows,

> I just take some videos of it and upload it to my story [in social media], I take the screenshot of the certificates and upload it to my story and, story in Facebook and Instagram and that leads people curious about what I'm doing so they asked me about how they can engage in it also so I have directed many people towards it, and it really makes me happy.

<u>School support</u>

Nine of the participants mentioned their schools encourage their MOOC learning by posting students' certificates from MOOCs on social media, providing small incentives, organizing small workshops on MOOCs, and offering access to technology and the internet. For example, Chaha said, "I still remember our school's page posted about my certificates, our certificates through the engagement of MOOCs in Facebook, and thousands of people saw that and many people messaged me about how they can engage in that." Apparently, her school used social media to promote MOOC learning by displaying students' achievements; in turn, it

encouraged students to engage actively. Similarly, Daxa mentioned that her school promoted such self-directed learning on MOOCs and so it motivated them with rewards. She argued,

> You know it's like actually had my school it was even be rewarded, if you are trying to learn yourself like learn for yourself more than you [do] for completing of your courses, you would even get a reward. I think that is a great way of encouraging students…we all are excited when we hear about prizes for completing something like they have been encouraging us. Just don't be limited to the textbook.

Schools also support students' MOOC learning by providing an active learning environment with guided workshops and presentations for teachers and students to share tips on MOOC learning, which was claimed to be beneficial. As Ehani described,

> In our school, there is a big conference hall, and we sat down together and was big audiovisual and they showed us how to get enrolled in college courses and how to [sic] to write financial aids then we learn from them and [sic] our teachers taught us how to get enrolled by using financial aids and that helped a lot.

While students struggle with limited technology and internet access, some schools open computer labs to support students' MOOC learning. For example, Juddha observed, "We were given the permission to use the school lab in order to continue our [MOOCs] courses."

Family support

Twelve of our participants indicated that their MOOC learning was greatly supported by their families in various ways; their learning also positively inspired their family members to engage in learning new things. Aange pointed out that his mother was extremely proud of his MOOC learning, and so she always took time to observe his learning and see the certificates that he gained through MOOCs. As he stated, "Even though she is uneducated, [sic]she sits behind me and she observes what I am doing, how I am learning through the computers, how I am learning through the internet, and she feels so good." Chaha also mentioned that her learning experience inspired her family members to start MOOCs. She noted that,

> …even my younger brother [and] sisters and the other ones as well, they also asked me how we could do some courses, how we could be involving MOOCing and even I help them to be engaged in such activities and they felt that it was really amazing.

Interestingly, many parents did not like their kids staring at laptops for a long time before they realized that they were learning from MOOCs. For example, Faneel admitted,

> In the beginning, my parents are not so supportive. And my parents told me not to use laptops, not to use mobile phones; but after I did more than 10 courses and I showed them that I have done it and my parents are so much so proud of me, and they also share it on social media, "my son did that. I'm very proud" in social media and they are very proud of me.

After seeing the achievement of their kids' MOOCs learning, many parents even brought internet and technology access to their homes to support continuous learning. For example, Saudis observed, "My parents really supported me for that. Like others were dedicating games, but my parents supported me [by] providing me ICT tools which really like encouraged me from the inside to do MOOCs." Similarly, Faneel exclaimed that his parents were so proud of him that they got him Internet service and a computer so that he can take MOOCs at home on his own.

Learning Outcomes and Impacts

Interview data indicated that Nepali adolescent learners taking MOOCs leads to many positive learning outcomes and impacts, including improving their independence, supplementing school learning, supporting their career paths, providing practical skills beyond theories, and achieving mental well-being. Several quotes listed below exhibit these benefits.

Among all the key outcomes mentioned above, learning with MOOCs leads to the development of practical skills was most reported by 10 of the 13 interviewees. For example, Geetu mentioned that she took MOOCs about mental health, and what she learned through these courses transformed into a practice even to support people with mental health locally. She observed,

> In my community, so many people are suffering from mental health illness. [The MOOC course on mental health] has developed confidence in me and I can help the people in my community, because I have learned at least some things on that topic and I have my people in my community even my own friends [who] were suffering from depression. In today's sense, I'm helping them to overcome by giving them the knowledge that I've gained.

She further explained that she took several MOOCs related to COVID-19 education which greatly benefits her community in real life. As she explained,

> …our Nepal is a [sic] developing country, many of my relatives are illiterate and they don't know how to care [of themselves] during COVID-19 and I have done several courses [on] COVID-19 and I have told them about the measures that need to be followed once infected and they are taking care of their health… I've also advised people [using] knowledge that I gained.

Eight interviewees also indicated that learning via MOOCs contributes to their life-long well-being. Faneel declared that "the benefits of MOOCs are that it builds up our personality." He elaborated on that by noting,

> I think my English language listening, writing, reading skills, and computer skills, personality development skills, leadership skills have increased to a great extent, and it helped me to be prepared for a better future. And it assist[s] me a lot for my society, for my expose in my present time.

Similarly, Ehani said that the design of MOOCs often allows her to make mistakes and learn from mistakes, which reinforced a positive attitude towards mistakes in life. As she explained,

> But like when you start doing and trying it even if you do mistakes, you can get to re-attempt at like the problems, in our life also there are so many problems going on and, we once we do mistake we get to learn from that mistake and we can keep on going on, so it has improved my habit and it has improved those skills.

About half of the interviewees also claimed that MOOCs can supplement their school learning by providing relevant information or including content not typically offered in formal schooling. For example, Aange explained,

> I've taken the course of sustainable development goals from MOOC[s] and I just take that thing with my regular classes. I have the sustainable development goals in my syllabus too. I have learned sustainable goals in my MOOC, and I have already done that, so it makes very easy [sic] to transform that knowledge [into] my regular classes, into writing to express my thoughts, to express my learning outcomes here so. MOOC[s] ha[ve] directly made change and it has influenced the learning of regular classes and regular schools and colleges and the syllabus of my college.

Even if some courses are not offered by formal schooling, MOOCs can provide complementary knowledge to support adolescent learners' exploration. For instance, Binsa talked about how she took classes not taught in school, such as astronomy, because "they really benefit me and make me [sic] interest[ed] and satisfied."

Three interviewees also indicated that MOOCs supported their career selections by broadening their views and providing career-related courses. In the following quote, Binsa discussed her new perspectives on possible fields of study and her newfound career prospects,

> We've been brought up in a society where you're either [a] doctor or engineer... If you could not be either one of them, so you were unsuccessful. So learning about so many

> different fields through massive open online courses was really a huge eye-opener and has made me believe in many different subjects and many different fields, growing my interest in those fields.

A few participants also indicated that learning MOOCs improved their independence, especially in terms of self-managed learning time. Ehani reflected on this situation: "It was kind of difficult to manage time for myself before, but as I started taking MOOCs, I started to give time for myself, I started to learn by myself, which before [I took] help from others."

As a result, adolescents learning from MOOCs have the opportunity for immediate academic or practical skill improvement. These adolescents can also experience substantial long-term benefits, including enhanced mental well-being, expanded career options, and a heightened sense of independence.

Discussion

This study aimed to explore a less-discovered MOOC learning experience of adolescent learners from Nepal to better understand the learning challenges and needs of K-12 MOOC learners. It was also designed to reveal local support and resources that have proven useful through their learning experiences. With this design, it is possible to provide some tentative suggestions for improving MOOC design to adapt to the growing needs of young learners.

The biggest challenges reported by the interviewees are struggles without sufficient guidance and scaffolding, language barriers, and limited access to the internet and digital devices. Issues that were also noted include misaligned levels with younger learners. According to Mendoza et al. (2017), these are three key barriers to adopting MOOCs for learning. Apparently, three of the four major challenges (i.e., lack of scaffolding and guidance, language barriers, and mismatched levels in terms of course content) that we found in this group of Nepali adolescent learners were caused by a combination of design barriers and personal barriers as classified by Mendoza et al. (2017). However, technology and internet access issues fell into the environmental barrier category.

As MOOCs were originally designed for adults (Impey & Formanek, 2021), the design barrier and personal barrier are largely influenced by the mismatch between the level of knowledge of K-12 learners and the learning objectives defined for adult learners. Though these learners demonstrated a high capacity for self-directed learning (Li et al., 2023), they, nevertheless, still needed some scaffolding and guidance to familiarize them with the MOOC platforms and efficiently locate available resources and useful information.

To resolve the various challenges and frustrations reported above, the findings suggested that the support from local learning communities was particularly critical and effective. As indicated by Siemens and Downes (2005, 2009), learning takes place in a social context surrounded by peers, teachers, family, and school. Our study reinforces that various stakeholders play distinct roles in supporting learning. For example, in our case, teachers in local schools played a significant role in introducing MOOCs to a broad student body locally, providing timely information and technology-related support to students, and fostering an encouraging and positive learning environment. Local peer support was also critical for this group of Nepali adolescent learners because it served as a resource to resolve issues regarding MOOC learning, whether content-related or technical, and allowed them to share learning experiences and advice with each other. While teachers and peers helped students to identify and suggest courses that matched their learning capacity and school learning, learning became relevant, effective, and meaningful for these young learners, in particular, given that these learners' primary language was not English.

This finding is consistent with Firmansyah and Timmis' (2016) statement that face-to-face local learning communities are crucial for non-native English speakers who enroll in MOOCs to learn more smoothly. Moreover, as participants indicated, their choice of MOOCs is constrained by their language proficiency. Even if they wish to take MOOCs in a specific field of study, the challenge of not fully understanding English spoken in video lectures can discourage and hinder their participation. The implications of this finding point towards the need for future research to delve into the intricate interplay between language challenges and their influence on participants' engagement, comprehension, and overall learning outcomes. Such exploration is paramount not only for understanding the complexities of language barriers but also for addressing the associated issues of equity and accessibility within the MOOC landscape (as indicated in Adam, 2019; Breslow et al., 2013; Colas et al., 2019; Duru et al., 2019; Lambert, 2020).

Furthermore, school and family support are also very valuable, particularly in regard to providing and sustaining students' motivation. As participants indicated, some schools provided incentives, posted their achievements on social media, and offered space and technology for students to access MOOCs and organize MOOC-related activities. Such support significantly motivated students to engage in MOOC-based learning and develop confidence in navigating the self-directed learning process. Students were also highly motivated by encouragement from their families. Some families even installed home technology and the internet in order to support students' MOOC learning. While many people and resources supported their efforts, this group of young learners also, in turn, inspired their family members to engage in active and lifelong learning as well.

As the findings of the study showed, support from local learning communities (i.e., teachers, peers, school, and family) towards this group of adolescent MOOC learners in Nepal has powerfully contributed to an open learning environment where everyone can start and participate in such online learning and expand it to local communities. Starting with teachers promoting MOOCs to students, students were brought into the learning community formation. Then, as some students became experts in this community, they brought more peers and family members into the community and shared knowledge and experiences with them, and eventually formed a social learning community across teachers, peers, schools, and families. During the time learning together, learners in this local CoP grew strong relationships within and out of the learning context, and fulfilled their need for affiliation (Lemme, 2006). These study results reinforced the view that learning sustains and nourishes knowledge obtained from community practice, and collective knowledge contributes to the development of personal histories and shared identity in the context of the community (Wenger, 1998). Our findings also coincided with major literature reports that collective learning within groups contributes to satisfying MOOC learning experiences (Firmansyah & Timmi, 2016; Li et al., 2014).

While few studies have been conducted with adolescent students learning from MOOCs; even fewer have explored the impact of such MOOCs on career aspirations and ambitions to pursue higher and further education. As mentioned, Koutsakas and his colleagues (Koutsakas et al., 2020) published an important review of 21 studies found in the literature related to K-12 MOOC studies. Those studies indicated that, in general, MOOCs can be successfully incorporated into pre-tertiary education and that they tend to have a positive effect on learning when certain conditions are put in place. MOOCs can effectively function as a supplement to traditional education or, in effect, work in a blended fashion, such as when using MOOC video materials to flip the typical classroom-based learning model (Cohen & Magen-Nagar, 2016; Ferdig, 2013).

Koutsakas et al. (2020) also noted that research shows that MOOCs are effectively being used in K-12 education both for remedial instruction as well as for students to complete advanced placement courses (Koxvold, 2014; Briggs & Crompton, 2016). The articles reviewed by Koutsakas et al. (2020) indicated that students increased their subject matter knowledge as indicated by classroom performance and improved test scores (Canessa & Pisani, 2013; Grover et al., 2016; Najafi et al., 2014) and were quite positive with their experience with MOOCs (Staubitz et al., 2019). Not too surprisingly, students enjoyed the self-paced nature of the courses and the ability to review the materials at any time and place (Canessa & Pisani, 2013); such personal control and empowerment are often lacking in traditional K-12 education.

Similarly, our findings also indicated that MOOCs brought significantly positive learning outcomes and impacts to these Nepali adolescent learners, such as enhancing their independence, and complementing their education. However, the findings further revealed that MOOC learning

for this group of young Nepali learners also significantly expanded their career options, affording them a skillset beyond theory, and supporting their mental health. Clearly, while there are several significant issues and challenges still to be overcome, there are myriad potential opportunities and benefits for adolescents learning from MOOCs and many more that will likely be revealed in the coming decade.

Limitations and Future Research

The study has several limitations. First of all, data collected are from self-reported interviews, which may introduce biases and limit the validity of the learning outcomes and processes. However, given the exploratory nature of this study, the findings hold the potential for providing valuable information to inform the development of specific research questions for future research. In fact, as an expanded study, we are conducting teacher interviews to further enhance the validity of the study. Secondly, our interviewees' first language was not English; as a result, some of the researchers' questions could have been misinterpreted. Moreover, because this research used a convenient sampling method through a Nepali high school teacher, the learners who were reached were more likely to receive better support from teachers than those unreachable learners who self-initiated MOOC learning without community support. Additionally, while thousands of adolescent learners in Nepal K-12 education were learning from MOOCs, our findings were limited to this exploratory study that was based on only 13 interviews. Hence, the findings might not be generalizable to a wider population. A future study that collects data with a large sample population may help both in screening participants and in producing a more comprehensive view of this special learning situation among Nepali adolescent MOOC learners.

Conclusion

This exploratory qualitative study examined challenges, local support, and learning outcomes of adolescent students learning from MOOCs. The study found a variety of challenges that adolescent learners in Nepal experienced, including the lack of scaffolding, language barriers, restricted technology and internet access, and mismatched learning capacity and MOOC learning objectives that were initially targeted for adult learners. The support from local teachers, peers, schools, and families helped to resolve those challenges by offering the necessary scaffolding and guidance (e.g., providing lists of free MOOCs, hosting workshops, sharing resources), encouraging and motivating open learning among everyone, sharing learning advice (e.g., content-related, technology-related, navigating MOOC platforms), and providing technical and emotional support. Findings further suggested that MOOC learning increases the independence of these adolescent learners, supplementing school learning, broadening their professional paths, offering practical skills beyond theory, and achieving mental well-being.

This study uncovered the significant life impact of MOOC learning among adolescent learners that were not previously reported by other studies. It offers extensive insights into the less-researched K-12 MOOC learners in developing countries. The results reported here might inspire other disadvantaged communities to use MOOCs to expand learning opportunities to make learning more open, connected, and online. It may also inform MOOC instructors and designers of adolescent learners' struggles to design MOOCs that can better support their special needs.

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Ethics Board Approval

This study was conducted in compliance with the ethical standards of the Indiana University Institutional Review Board. The study protocol, including the informed consent process and data collection procedures, was reviewed and approved by the Ethics Board under the reference number 10983. Informed consent was obtained from all participants involved in this study. Any potential ethical concerns, including those related to data confidentiality and participant anonymity, were addressed in accordance with the guidelines established by the Ethics Board.

Conflicts of Interest

The authors declare that there are no conflicts of interest related to this research. This study was conducted with full transparency and impartiality, and the authors have no financial or personal interests that could influence the research findings, analysis, or interpretation.

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