Exploring the MOOC as a Community of Practice: developing a framework for knowledge construction

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Abstract

Massive open online courses (MOOCs) have increasingly become an important element for individuals' learning and development. However, MOOCs mainly concentrate on duplicating knowledge instead of constructing it. This research aims to explore the structure of the MOOCs for fostering the knowledge construction in which educational professional build, develop, share one another' learning and reflections. This research focused on Coursera, a particular MOOC community, by drawing on the concepts of community of practice (CoP) as a theoretical lens. Three types of data were collected. The archival data consisted of the top and selected posts from online discussion forums, and the elicited data which was derived from over 60 interviews with Coursera learners. Meanwhile, field note data was extracted from 160 days of interaction with the participants. A qualitative research method using a netnographic methodology was employed. The findings contribute to the body of knowledge construction and online communities by providing an understanding of the domain, community and practice elements. The study on other elements such as the reinforcement of identity, formation of warrants and identification of mechanisms for legitimate peripheral participation can help to interpret the constitution of CoPs in MOOC. This research developed a Coursera community framework that generally makes a MOOC community more energetic to construct knowledge.

1. Introduction

Massive open online courses (MOOCs) have gained importance over the past ten years as a vital component of individual learning (Deng, Benckendorff & Gannaway, 2019). As a result, over the past few years, MOOC providers (such as Coursera and Udacity) have changed their business model from offering standalone MOOCs to developing micro-credential and full degree programmes that will encourage learners to engage in more structured and intentional professional development (Pickard, Shah & De Simone, 2018). Recently, researchers have shown an increased interest in communities of practice (CoPs). A CoP is defined as

> *"a group of people who share an interest in a domain of human endeavor and engage in a process of collective learning that creates bonds between them"* (Wenger, 2001, p. 1).

An online forum can start a community which can evolve to a CoP throughout its life. The subject of knowledge construction is one of the significant discussions in CoPs (Azali, Quaddus & Xu, 2009). While MOOCs such as Coursera are considered to be traditional teacher-oriented instruction that has become technologically enriched, adopting a knowledge transmission model has become an area of criticism for this type of MOOC (Powell & Yuan, 2013; Xu, Wang & Yu, 2018; Rathee & Bhardwaj, 2020). Even though the total number of this type of MOOCs is increasing at

exponential rate, little study has been done on issue of knowledge construction and how it could be fostered. There is a gap in the understanding of the nature of knowledge construction and CoPs in MOOCs. So far, design-related studies on MOOC focused on the effectiveness or utility of a unique design component like a specific assessment method (Bey, Jermann & Dillenbourg, 2018) or the effects of utilizing a specific type of media on satisfaction, performance, or engagement (Nguyen, 2022).

The aim of this research was to examine a particular MOOC community, namely, Coursera, by drawing on the concepts of CoP as a theoretical lens. This research aimed to investigate whether Coursera forums can be considered as CoPs in which knowledge is being constructed. The discussion forum in MOOCs is considered as a communication and learning tool which facilitates learners' interaction and engagement in its environment (Mak, Williams & Mackness, 2010; Chen & Yeh, 2021). Through this interaction, members can share and acquire experience and/or knowledge (Harasim, 1993; Chen & Yeh, 2021). In other words, knowledge construction can take place in a community of learners and instructors who have social interactions and share their experience and knowledge (Su et al., 2010). This process is called "collaborative learning". Discussion forums in MOOCs are a ground for interaction and hypothetically a platform for knowledge construction via collaborative learning.

To be more concise, the focus was to understand the state of CoP elements in Coursera forums in this particular community. Examining the Coursera community from the CoP perspective develops a CoP-based MOOC model and makes an understanding of how the MOOCs can foster knowledge construction via a MOOC community.

The findings of this research provide a sound foundation for understanding community in the context of Coursera. The community features such as identity, warrant and LPP (legitimate peripheral participation) offer a unique setting for this study. The findings also suggest how the identity of the learners and the community can be improved. The findings identify some mechanisms that serve as a warrant. The significance of these three features (identity, warrant, LPP) has been noted in this study as factors that shape a CoP. All of these findings would set a foundation for the structure of a Coursera community that would allow for future cultivation of CoPs in MOOCs. Besides, the findings provide a foundation to develop a Coursera community framework for fostering knowledge construction in MOOC discussion forums through developing a community as a CoP. The findings also suggest that MOOC providers should effectively improve its structure and cultivate community in order to be a CoP and to have a knowledge construction environment.

The work is structured as follows: an introduction section that shows the objectives of this study and a few literature studies followed by a methodology section,

data collection, data analyzing sections and result section. The discussion section elaborates on the outcome of the research. Finally, the conclusion is drawn in the last section.

2. Literature review

2.1 Community of practice

Based on the definition of CoP, a community can be built for learning reasons or learning can be the outcome of the members' interaction. It needs to be considered that not all communities are CoPs. The three characteristics that are crucial for CoPs are a domain, community and practice as discussed next. The outcome of the four forces of identity, knowledge sharing, warrant mechanism and legitimate peripheral participation (LPP) can help to interpret the constitution of CoP (Silva, Goel & Mousavidin, 2009).

The concept of CoP has advanced over time (Kimmerle et al., 2012). Much knowledge construction and sharing happens in contemporary online environments (Cress, Kimmerle & Hesse, 2009; De Wever et al., 2010; Fang & Chiu, 2010; Fields & Kafai, 2009; Held, Kimmerle & Cress, 2012). In a CoP, the main process of knowledge construction is supposed to be mediated by the experienced members who improve practices (Kimmerle et al., 2012). In fact, a community can progress from an information-sharing forum to a CoP in which knowledge is being constructed.

The World Wide Web enables virtual communities and facilitates knowledge construction and sharing for CoPs (Lin & Hsueh, 2006). Virtual CoPs are networked social groups which are gathered around "shared practices, information, and knowledge that exists for them through mainly electronic means such as online forums, bulletin boards, and email" (Wasko & Faraj, 2005). They highlight the vital role of knowledge for the upkeep of virtual CoPs and as the most important resource for the members. Wang (2010, p. 267) states that online CoPs offer a range of benefits for learners, including

> *"cognitive development, opportunities for growth as independent learners, opportunities to practice newly acquired knowledge in a supportive environment with peers".*

2.2 Theoretical Lens

Based on literature, CoP can define such phenomena as the result of different forces which can be conceptualized as identity, knowledge sharing, warrant mechanisms and legitimate peripheral participation (LPP) (Silva et al., 2009). In addition, the three characteristics that are crucial for CoPs are a domain, community and practice.

The Domain creates a common ground and a sense of common identity. Domain of community encourages members to contribute and participate (Wenger, McDermott & Snyder, 2002). The community

encourages learners to share their ideas, ask their questions and listen to others (Wenger et al., 2002). A strong community fosters interactions based on trust. An effective CoP offers a space of exploration where it is safe to speak the truth and take hard questions (Wenger et al., 2002). Besides, a set of ideas, tools, information and documents that members share makes a practice (Wenger et al., 2002). The domain represents the topic that the community focuses on and the practice is the knowledge that the members improve, share and sustain (Wenger et al., 2002).

As members of a CoP participate in it, an identity becomes developed in that community (Lave, 1991; Wenger, 1998). Reinforcing identity is one of the motivations for participating in CoPs (Pan & Leidner, 2003). Besides, the detection of valuable and invaluable posts is problematic in the community. Establishing a warrant mechanism could help the members, especially newcomers, to distinguish the posts that are valuable. Lave and Wenger (1991) describe legitimate peripheral participation (LPP) as a phenomenon in which newcomers in a CoP firstly observe a practice from the periphery and as time passes become more engaged with those practices. LPP refers to the process of becoming an experienced member in a CoP. Indeed, there are three main levels of community participation (see Figure 1). A large portion of community members are peripheral and rarely participate (Wenger et al., 2002). Distinguishing legitimate from illegitimate participation is one of the issues faced in a community (Silva et al., 2009). Here, we posit that these concepts are able to assist us in understanding the constitute structure of emerging CoP in MOOC in addition to unraveling the social practices that form a community in MOOC.
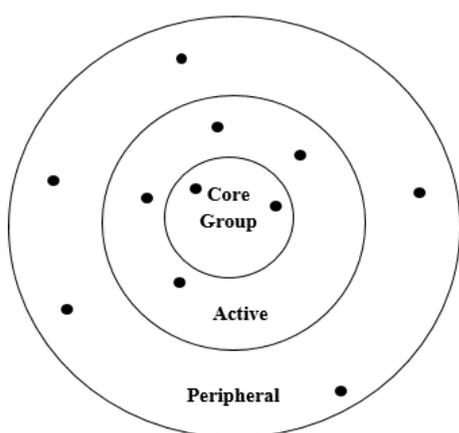

Figure 1 - Degrees of community participation (Wenger et al., 2002).

3. Methodology

It was decided that the best method to adopt for this investigation was Netnography. This method is different because it looks online communications as social interaction not as content; it pays very more attention to

context (Kozinets, 2010). Netnography looks differently to social interactions; it considers not only the words but also forum elements, member characteristics, the language, the history, the meaning, and the type of interaction (Kozinets, 2010). It observes fonts, symbols, texts, images, photos, and videos (Kozinets, 2010).

In this study, the author studied three courses in Coursera and observes the learners engaged in it and consider technology as a main factor in providing an environment in which people can be linked to one another. The main phases of this research includes: identifying and selecting the community, observing the community and collecting data, analyzing the data and making iterative interpretations of the findings, and representing and evaluating the findings. As mentioned in our previous paper, Coursera was selected as the suitable research site for this study. Coursera provides higher education courses and there are no enrollment limitations in terms of members' age or education level. Netnography as a participant observational research contains three types of data: archived, elicited and field note data.

The data collection process was started by entering the "Learn to Program: The Fundamentals" course in the https://www.coursera.org/ (see Table 1). The researcher participated in activities as a member ranging from watching videos, taking quizzes and participating in discussion forums. In order to have thick data for research purposes and to reach saturation, the second and third rounds of data collection were conducted.

Course Name	Duration	University
"Learn to Program: The Fundamentals"	10 weeks of study	University of Toronto
"Critical Perspectives on Management"	9 weeks of study	IE Business School
"Data Analysis and Statistical Inference"	10 weeks of study	Duke University

Table 1 - Three rounds of data collection.

The second round of data collection started by the researcher entering the course "Critical Perspectives on Management". In the third round, another course from Coursera was chosen based on the data mining students' needs in UTM University. The "Data Analysis and Statistical Inference" course was chosen as a part of the data mining course. During the three rounds of data collections, archival data was captured from the discussion forums, elicited data was captured from interviews with participants in courses and field note data was captured through the researcher's participation.

In this research, as the field of study is the Coursera, the population contains people with various socio-economic and demographic characteristics. Although this can be a possible ground for selecting appropriate people who are willing to take part in this research, they might not have enough knowledge for the subject of this research. To get the best out of this context, observation was employed to have the researcher's own participation and sense of membership, in line with the interviews, to get

the use of the information of those who were willing to participate in this research.

The observation in this research contained any interesting point ranging from the quality of course videos to students' comments and discussions. While the researcher takes notes of what is observed, she also interprets it and takes note of what she experiences herself in order to understand the lived experience of a regular member in this community. The course observation focused on two things: the discussions in the discussion forums, and field notes taken during the period of data collection. Throughout the data collection period, field notes were taken based on the observations. The field notes included the observations of the community, its members, interactions and meanings, and the researcher's own participation and sense of membership.

To collect the interview data, a structured interview was prepared using the same wording and order for all of the respondents as suggested by Kumar (2005). To this end, a set of open-ended questions was prepared and an interview tool was prepared to collect data using Google Docs. The interview instrument was designed by reference to the work by Wenger et al. (2002), Saritas (2006), Keefer (2009) and Miniaoui and Halaweh (2011) and based on the guidelines proposed by Boyce and Neale (2006).

During analysis in the third round of data collection, it was found that from a certain point all the emerging codes were already extracted from the previous data. At that stage, the data had been collected from three courses and interviews had been conducted with over 60 respondents. The total number of 60 interviews is quite high for reaching the saturation since in qualitative studies, it normally happens in lower number such as 15 to 30. The reason might lie in the nature of Coursera and its various participants with different ideas and perspectives which contain more new information.

4. Data collection

The researcher selected the course "Learn to Program: The Fundamentals" for the first round of data collection due to the researcher's background. During this round, archived data for the first course was collected from the "Beginners Study Group" created by the course's teacher assistant. This was a common group with the highest points given by learners. Discussions in this group could be anything such as greetings, experiences, points of view and asking and answering questions. To enhance the quality of the collected data, the researcher discussed the subject of the research with the course's teacher assistant. He was interested in collaborating in this research. Due to his role as teacher assistant, he knew of the active learners in that course. He helped with data collection and disseminated the interview questions to those suitable to answer the questions.

Eleven responses were collected from the participants in the first course.

A second round was launched when the researcher enrolled in the "Critical Perspectives on Management" course. The decision about enrolment in this course was based on the available course start dates and the researcher's background. To gather the archived data, the researcher searched the forums and observed the most active forums and members. In the second course forums, there was a group of active learners who were creating a weekly post regarding each week's discussion. To enhance both the quality and quantity of the interviews, the researcher asked the course lecturer's to share the interview form on this course's Facebook page. It was parallel with another post that was shared in the study group. A total of 33 learners filled in and returned the interview form.

For the third round of data collection, the researcher took an opportunity to observe an online course offered by Coursera which was also taught in the UTM data mining course as a part of an evaluation process for students. The "Data Analysis and Statistical Inference" course was taken which was used as a part of the "Data Mining" course in the Faculty of Computing. In order to observe discussions among these students and as an enhanced version of what was planned in the second round of data collection, a study group was created in the discussion forum entitled "Malaysian study group". This was done to direct the discussions to a particular forum for an easier and more focused observation and analysis. The archived data in the third round of data collection consisted of the discussions in this study group. For the elicited data, the online interview form was shared through the "Malaysian study group" forum. This was the same interview form which was used in the previous rounds of data collection. In this round of data collection, the elicited data comprised the responses of these 22 students who took the "Data Analysis and Statistical Inference" course in Coursera.

5. Data analyzing

The researcher followed the bottom-up perspective (inductive approach) by coding, abstracting, checking and refining (Kozinets, 2010) while reading through the data. While doing so, the researcher applied the CoP theoretical lens in order to better understand the possible existence of a CoP in the Coursera. After coding, the coding was reviewed and discussed with a colleague familiar with qualitative research. The process of recoding was done based on agreement. Through this step, the data was coded under the six structural elements of the CoP framework, namely, domain, community, practice, identity, LPP and warrant (See Figures 2 and 3). To ensure the trustworthiness, the strategies that were used in this research were: prolonged engagement, triangulation, member checking, peer examination and the code-recode procedure.

Figure 2 - Screenshot of NVivo showing "Interview" nodes in nodes section.

Figure 3 - Screenshot of NVivo showing nodes related to CoP elements.

6. Results

Coursera may only be creating a crowd, and not a learning community (Gaebel, 2013). There is a dearth of research about the ability of the Coursera community to be a CoP. For this purpose, this study employed the CoP theoretical lens to investigate the possibility of CoPs being built in Coursera. This theory was applied to observe the interactions in discussion forums and identify the structural elements of the Coursera community based on the identity, warrant and LPP concepts. Through the analysis of discussion forum posts (discussion forums in Coursera last during next coming rounds of that course), the practices and mechanisms that give form to the Coursera community were identified. The theoretical account of these concepts can help interpret the constitution of CoPs in Coursera (see Tables 2 and 3).

From our field note data we can conclude (I) any variation that attracts learners' attention has a positive effect in following the video lectures. It can be in regard to the professors, their clothes, the background and other motivating objects. This kind of teaching with several professors might reinforce the identity of Coursera. (II) In-video quizzes provided an opportunity for learners to think about the topic and then listen to the recorded discussions about that topic. This type of teaching especially for a management course might increase learning and could reinforce the Coursera identity for this type of teaching. (III) The short length of the

Concepts	Illustrative Data	Analytical Generalizations
Domain	"Find new connections...", "participation in discussion forums was nice because I could make new friends...", "When I did, I felt give and take was very helpful.", "Everyone is helping each other to solve the question. Discussion forum become a platform for us to share knowledge in order to solve question.", "I gain information...", "increase communication."	What they normally gained by participating in the discussion forum: • Networking • Feeling of being helpful • Exchange of knowledge • Learning • Communication
	"In other threads if I sense I can help others and the other people accept me this also create sense of belonging.", "Sometimes, It does. I feel there are some people who are here to learn what I aim to learn. So we are here for same reason which gives me a sense of belonging...", "Yes, Exchanging ideas had make me understand my classmates' behaviors.", "because you get to know new awesome people.", "when you are interacting with an unknown person over the same problem or a person who gets you a solution then a sense of belonging is likely to develop.", "because it brings the learners closer.", "yes. It's nice to know someone care for others ..."	Do you think the discussion forum influenced you to have a sense of belonging to the community with the classmates in the course (Explain why): • Feeling of being helpful • Commonality • Knowledge sharing • Networking • Participate and communicate • Sense of intimacy • Supporting person
Community	"To post without knowing your real identity.", "It helps build conversation.", "The community is ever willing to respond to each other's questions. They will nudge you to think differently...", "Stimulates thoughts and ideas.", "Sharing helps one individual in learning.", "It is open forum and any student can share their legitimate views.", "there are lots of nice people there who want to help...I want to participate in the forums.", "talking about his/her own experience, asking for help ..."	How the discussion forum encouraged learners to share ideas and ask questions: • Anonymous • Communicate • Community members • Incentives • Learning • Open forum • Supportive people • Sharing of ideas leads to synergy
	"If I see people share their real feeling and the experiences in learning and the problems and help, this create trust.", "maybe online video chats", "Academic honesty and general positivity.", "good people taking their time to help others"	What kind of activities that generate trust in the Coursera community: • Discussion • Facilitative tools • Netiquette • Sharing • Supportive community of people
Practice	"Idea is the most interesting part during the discussion which is we cannot get from any sources...", "documents that I have and can help others in this course."	The following list shows the common practices that members exchange with others: • Information • Ideas • Stories • Documents • Tools • Language.

Table 2 - Summary of findings related to domain, community and practice.

Concepts	Illustrative Data	Analytical Generalizations
Identity of Coursera	"I see this course bringing universe under single umbrella…"	• Global education
Identity of Coursera learners	"You're welcome. We are all here to help each other. Take your time with it. You don't have to complete all the steps at once. Let me know how you get on with this approach.", "… you make a great point on the demand side.", "There is a link to the textbook on …"	• Netiquette • Receiving positive comments • Supportive people • Voting system
	"It gives free and wide variety of courses.", "trusted information or idea given in the discussion forum will create or reinforce identity of Coursera.", "can more interact with other people.", "I think strong teachers help inspire the community ...","Active users on forums who are willing to help others understand the course they are taking", "Language mainly. If we didn't understand what other participants said, it will be a disadvantage", "getting more influence and more acceptable certificate might help it to become more important in the world of teaching"	The factors that create or reinforce the identity of the Coursera community: • Being free and open • Discussion forum or Facebook groups • Communication through the Coursera discussion forum • High quality teaching • Participant behaviors that generate trust and respect in the discussion forum • System design factors (website usability and language facility) • Obtain a certificate from a top university
Legitimate peripheral participation – Newcomers	"used so much paper it was almost ridiculous - but like you… it helps me to understand.", "things that I've had the most trouble with relates to the Python Visualizer. "Visualizing Function Calls" was a bit difficult; perhaps it will be worth emphasizing to your students!", "Here are my answers for the exercise. I do not have an economics background so would be really interested to hear any ideas which can enhance my understanding of the issues.", "We'll have to wait to Prof. explanations on ... ! Not sure if I can wait so long", "Hello everyone! My name is .., greetings from Mexico!", "So Please allow me to challenge this. (And please feel free to challenge my reply.)"	• Commonality • Complain • Discussions • Support from lecturers or staff • Self-introduction • Positive behavior
Legitimate peripheral participation – Old-timers	"As far as I can remember, Question 11 on Exercise 2 is asking you to decide what the Type Contract is for the example given. You don't need to have worked through the examples in this video to understand what a Type Contract is. This is mentioned in the Function ...", "As well as these forums, there is also a Facebook group - administered by X. It is a private group and you have to send your Facebook to be sent an invitation.", "After my excitement subsided I thought we could do well with a thread discussing the study questions. I'm not sure if one thread would be better, or if we should have one thread for each question - this would depend on the volume of the replies", "I cannot resolve the problems directly for you. It is against the honor code for me to do that.", "Thanks for starting this!", "Teaching Assistants and Staff also monitor all forum threads, so I'm sure .., and they will be able to jump in with advice!"	• Facilitator • Initiate a group in Facebook or in discussion forums • Moderating role • Obey the honor code of Coursera • Receive more respect • Teachers and teacher assistants also play a role as old-timers
Warrant	"Thank you... for spear heading this thread. Outstanding contributions I must say.", "Teaching Assistants and Staff also monitor all the forum threads, I'm sure that if no one here can help, they will be able to jump in with advice!", "Interesting discussion. In addition to oil, the staples food market also bear similarities to the Roman grain market…." [8 up-votes received]	• Receives positive comments • Teacher assistant • Voting system

Table 3 - Summary of findings related to identity, warrants and LPP.

Coursera videos is a feature that might enforce its identity (See Figure 4). (IV) Providing quiz feedback to develop sufficient understanding might reinforce the Coursera identity (Figure 5). (V) Learning involves improvement in answering questions through several attempts and with, rather than without, outside assistance (Figure 6). (VI) Patronages detect what needs to be communicated in the community and they know how to present information in useful ways to help learners. Thus, through their active participation, these members can act as moderators. (VII) Members who are active in the forums or other groups improve their identity in others' minds. These people are careful about others' problems and help them to solve their doubts. We called them Samaritan who play supporters roles in the community. Role-playing, or assigning roles to discussants could be effective in promoting knowledge construction (Chen & Yeh, 2021). (VIII) In an environment with a mass of discussions and so many groups, members need some warrant in order to help them choose a group or accept information wisely. Appreciation statements are kind of warrants helps to determine relevant content. (IX) The Coursera voting system is an important feature that enables members to express their views about others' posts. This type of vote can improve the identity of the individual.

7. Discussion: theoretical and practical implications for Coursera

As discussed above the findings were organized in six subsections, each corresponding to the components of the CoP theoretical framework. A summary of the theoretical implications is presented in Table 4.
The identification of structural elements of the Coursera community helps to interpret the constitution of CoPs in MOOCs and unravel the ways that give shape to the discussion forum community. The theoretical implications are presented in the form of analytical generalizations (Lee & Baskerville, 2003; Yin, 2013). The main purpose of these analytical generalizations is to present findings of this study in a way that they could be the grounds for conducting confirmatory studies.

- xMOOC community cannot exist without facilitators and moderators.
- Fostering sense of belonging is necessary to form a community in xMOOC.
- Building trust is fundamental for xMOOC community to have more participation.
- In xMOOC community, voting system, comments on posts by someone knowledgeable (teacher, teacher assistant) become warrants for the quality of the posts.
- xMOOC community cannot exist without old-timer members; it needs to create fire in the core of the community through holding challenging discussions or assigning incentives.

- Participants netiquette, being active and supportive form the individual's identity in xMOOC.
- xMOOC community cannot exist without facilitative tools and social networking sites.

The recommendations to practitioners also are summarized in the form of main points. These points
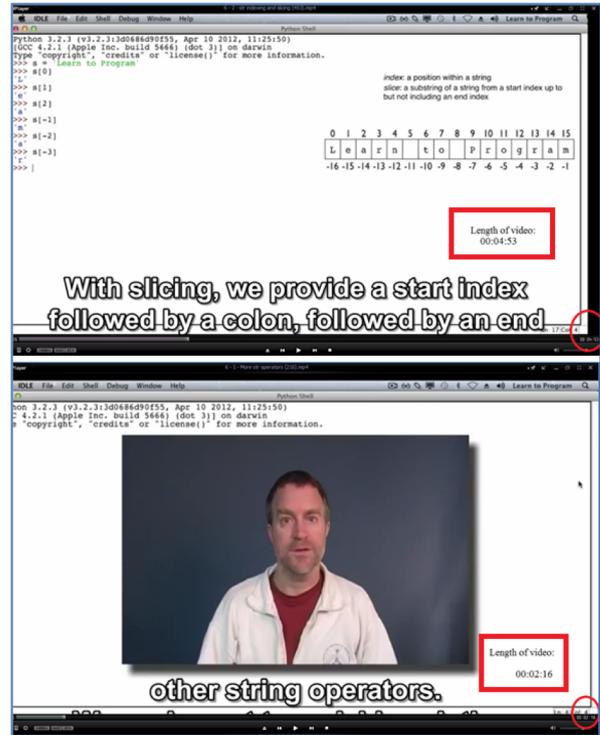
Figure 4 - Short length of Coursera video lectures
(Source: Coursera - "Learn to Program: The Fundamentals" Course).
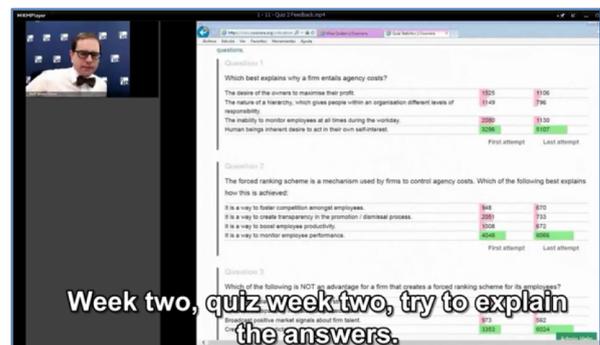
Figure 5 - Quiz feedback through video lecture
(Source: Coursera - "Critical Perspectives on Management" Course).

Figure 6 - Number of permitted attempts for quizzes and homework
(Source: Coursera).

Theoretical theme	Findings
Identity of Coursera	Identity of Coursera community is developed by being a global education provider.
	Identity of Coursera community is developed by being free and open education, creating a group on the discussion forum or Facebook. Possibility to communicate through Coursera discussion forum, participants' behavior and participation also enforce Coursera identity. High quality teaching provided by Coursera and top university certificates are other factors to develop Coursera identity.
	Availability of several professors in one course, embedding quiz before discussion in class, quizzes with several permitted attempts, the feature of Coursera videos which are divided into short length videos, providing quiz feedback to develop sufficient understanding all might reinforce the identity of Coursera.
Identity of Coursera learners	Identity of Coursera learners is developed by their netiquette, by receiving positive comments from others and being supportive. The voting system also has an effect on learners' identity.
Domain	Coursera learners gain networking skill and knowledge sharing experiences; they get helpful feeling and facilitate learning and communication through participation in discussion forum.
	Sense of belonging to Coursera community is heightened by having helpful feeling, commonality feeling and sense of intimacy. Sharing knowledge, participation, communication and networking also can create sense of belonging in discussion forum. The existence of supportive people in Coursera community also creates a sense of belonging.
Community	Coursera encourages learners to share their ideas by providing an opportunity to communicate more with others and this leads to synergy. Providing incentives for the community members could encourage some learners to share their ideas. Members of the Coursera community with various perspectives can give encouragement to learners to share their ideas. Existence of supportive people in Coursera and sense of being helpful for others in Coursera encourage learners to share their ideas. Learning through sharing ideas could be another encouragement to share ideas in Coursera community. The option to be anonymous in Coursera community and open forum characteristic of Coursera are other factors that encourage sharing ideas.
	Trust in Coursera community can be generated by discussion activity, sharing activity and following netiquette standards. Creating a supportive community of people is another way to build trust. Facilitative tools also help to generate trust in Coursera community.
Practice	The common practices that are exchanged in Coursera community are information, ideas, stories, documents, tools and language.
Warrants	Voting system in Coursera is a mechanism to create warrant in discussion forums. Coursera learners have positive feelings when they receive up-votes for their posts.
	In Coursera community, learners detect useful posts based on subject or heading of the posts, helpfulness of post and popularity of post. Reading and scanning the posts to find useful post is also used even though it is time-consuming activity. Teachers and teacher assistants' comments could be another way to detect useful posts and create warrant.
	In the Coursera community, receiving positive comments from others, teacher assistants and voting system create warrant to distinguish what is valuable and what is not in discussions.
LPP	Having commonality and positive behavior, being complaint, engaging in discussions, needing lecturer/staff supports are some Coursera newcomers' features. They also introduce themselves through their discussions.
	Being a facilitator, initiating a group, moderating discussions, receiving more respect and being compliant with the honor code are some Coursera old-timers' features. Teachers/teacher assistants could play the old-timer role in the Coursera community.
	In the Coursera community, newcomers could move to the core of community by their active participation, netiquette manner, spending more time and effort in discussion forum and reading to gain new knowledge. Low profile activities and receiving incentives could keep learners active and help them move to the core of the Coursera community.
	In the Coursera community, legitimate participation is detected through accurate and reliable posts, discussion, personal and critical reflection, using the Internet to verify others and the voting system. In addition, supportive people also can be considered as legitimate participants in the Coursera community. Believing different opinions based on different understandings have their own worth means that anyone would be considered a legitimate participant.

Table 4 - Summary of findings along with their relations to CoP theory.

could be helpful for MOOC providers or individuals interested in developing communities supported by discussion forum.

Although more research in this area is required, we propose Coursera has capability to be a CoP and these points are general guideline to develop CoP:

- Sense of belonging as another main element could be developed in xMOOC community through facilitating knowledge sharing and communication and integrating facilitative tools for creating networking and sense of intimacy (Sun, 2020, p. 602).

- xMOOC could be a strong community if it encourages learners to participate and share their ideas and concerns. The availability of various people with different ideas and their caring manner toward the problems of others could encourage learners to share ideas and concerns. Paying more attention to assigning incentives to people who are sharing their ideas and issues could also encourage learners.
- xMOOC community with large number of learners built trust to some extent because of the nature of discussion forum which is based on discussion and sharing. Integrating facilitative tools such as private messaging could develop trust through making close connection between learners.
- xMOOC community with high volume of discussion requires more warrants to detect valuable and invaluable posts. It has been solved to some extent by voting system mechanism but it could be developed more to show the meaning of each vote. Assigning more teacher assistants or someone as moderator to manage and control discussion forums could be an effective way (Drobot, 2023) (Chen & Yeh, 2021).
- Although xMOOC community is not a long time community newcomers and old timers are visible in this community because of their activities and supporting behaviors. What Coursera can do to move newcomers to the core of the community is to create a fire in the core of community through challenging discussion or assigning incentives to active participations. If the Coursera could maintain the communities for a long time helps to develop a CoP. This can occur through integrating with social networking sites or combining different sessions of one course with different start and end times.

8. A Coursera Community Framework (CCF) based on Social Theory of Learning

Having discussed the structural elements of Coursera in previous session of this paper, this study set out with the aim of fostering knowledge construction through developing a Coursera community framework based on Social Theory of Learning. The findings of the present study appear to be consistent with other research which found Coursera is not a learning community (Gaebel, 2013). However, these results on possibility of a CoP being constructed within Coursera have not previously been described.

The present phase of Coursera from the knowledge construction perspective suggested the approach of studying Coursera from the CoP lens to foster knowledge construction.

MOOC participants often feel disconnected from their peers, so generating a sense of belonging, and achieving social presence are of major challenges for MOOC platforms (Gamage & Whitting, 2021)The first layer in Figure 7 shows the structural elements of Coursera as a

CoP which helps to understand the domain of the Coursera community through understanding what learners gain through participation in discussion forums and how a sense of belonging could be created in the Coursera community. In addition, it helps to understand the Coursera community by knowing how Coursera could encourage learners to share ideas and ask questions. Furthermore, activities that generate trust in the Coursera community were identified. It also shows that the exchange of information, ideas, stories, documents, tools and language occurs in Coursera (see Figure 8).

The second layer in Figure 7 shows the results of how identity, warrant and LPP help to constitute Coursera as a CoP. We posit that the theoretical account of these elements can help us interpret the constitution of CoPs as well as unravel the important implications for developing the Coursera community as a CoP. As learners participate in Coursera, their identity becomes developed and this is one of the motivations for learners to join Coursera. Coursera's reputation as a free and open online education platform with high quality teaching and certificates could be a strong reason to join Coursera. As discussed by Ossiannilsson (2021) global organizations such as UNESCO, and WEF have highlighted the need of education to implement an open approach to achieve quality education and equality specially during COVID-19 pandemic. Besides, mechanisms such as the voting system, role of the teacher assistant and ability to add comments as warrants in Coursera help members to distinguish what is valuable and what is not. The characteristics of newcomers and old-timers in Coursera and how newcomers could become old-timers explain that Coursera learners could be divided into newcomers and old-timers even if it is a short-lived community. Newcomers could become old-timers if Coursera becomes a long-lived community and newcomers spend more time and effort on their participation. The results in regard to newcomers and old-timers explain that old-timers in the community facilitate knowledge sharing and learning (see Figure 8).
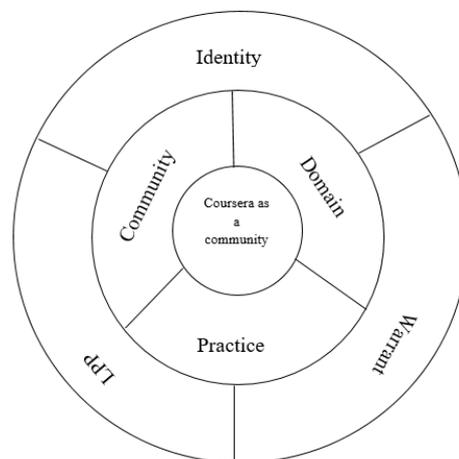

Figure 7 - Structural elements of Coursera as a CoP.

Domain

The things that learners stand to gain through participation in discussion forum:
• Helpful feeling
• Learning
• Networking
• Knowledge sharing
• Communication

Sense of belonging is created by:
• Commonality
• Helpful feeling
• Knowledge sharing
• Networking
• Participation and communication
• Sense of intimacy
• Supportive people

Community

The Coursera community encourageslearners to share ideas and ask questions because of:
• Learning
• Knowledge sharing
• Participation and communications
• Incentives
• Supportive people
• Anonymous identity
• Community
• Open forum

Activities that generate trust in community:
• Communication and discussion
• Netiquette
• Facilitative tools
• Knowledge sharing
• Supportive people

Practice

Exchange of:
• Information
• Idea
• Story
• Documents
• Tools
• Language

Identity

Identity of individual:
• Active participation
• Netiqutte
• Recieve positive comments
• Supportive people
• Voting system

Identity of Community:
• Global education
• Communication
• High quality teaching
• Top universities certificates
• Participants
• Free and open
• Community of forum- community on FB
• System design

Warrant

Warrant:
• Recieve positive commnets from others
• Teacher assistants
• Voting system

How learners detect useful posts in discussion forum:
• Depends on subject-title-headings
• Helpful posts
• Popularity of posts
• Reading posts
• Recognized by others as useful posts
• Scan and search posts
• Learners vote to:
• Express agreement and thankfulness
• Helpful posts
• Show willing to help
• Encourage
• learners' feeling when they get vote:
• Appreciative
• Encouraged
• Pleasant

LPP

New comers:
• Commonality
• Complaint
• Discussion and help
• Need support
• Self-Introduction
• Positive behaviour

Old timers:
• Facilitator
• Group creation
• Moderator
• Obey honor code policies
• Respectable
• TA-T role as old timer
• Commitment
• Leadership role
• Understanding and contributing

LPP

New comers become old timers by:
• Active and effective partiicpation
• More time and effort on discussion forum
• Incentives
• Low profile activities
• Netiquette manner
• Reading
• Detecting right and wrong answers by:
• Using voting system
• Supportive people
• Discussion
• Using the Internet searching
• Accuracy and realiability of posts
• Considering others's opinions
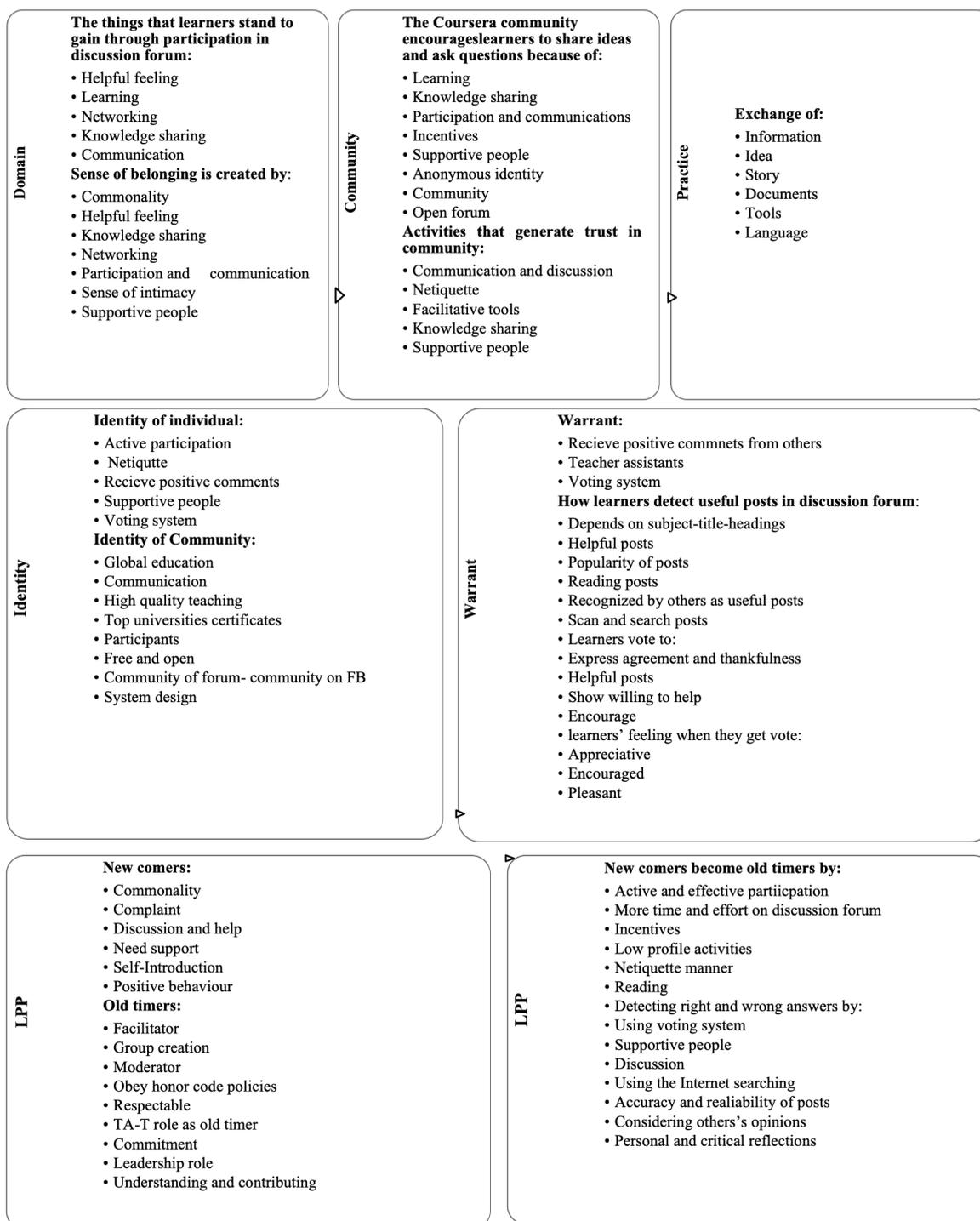• Personal and critical reflections

Fig. 8. Components of each structural element of Coursera as a CoP.

The rationale behind the Coursera community framework shown in Fig. 9 is that high emblematic features and their improvement are better candidates for an online MOOC CoP. This framework includes three layers. First, the inner layer consists of Wenger's main components. Second, the middle layer, as seen by Wenger as forces to form CoP. Their presence has also been studied qualitatively in this research. The third and outer layer shows amplifying emblematic features that help forming elements of CoP. This layer generally makes a MOOC communty more energetic to construct knowledge. It should be considered that these features are not grouped in a certain components of inner and outer layers. These features are: Active participation, Voting mechanism , Being free and global education, Social networking sites (Amemado & Manca, 2017),

Facilitative tools , Low level conflict , Highly focused discussion, Netiquette, Moderators (McMinn, 2021) and Positive behavior.
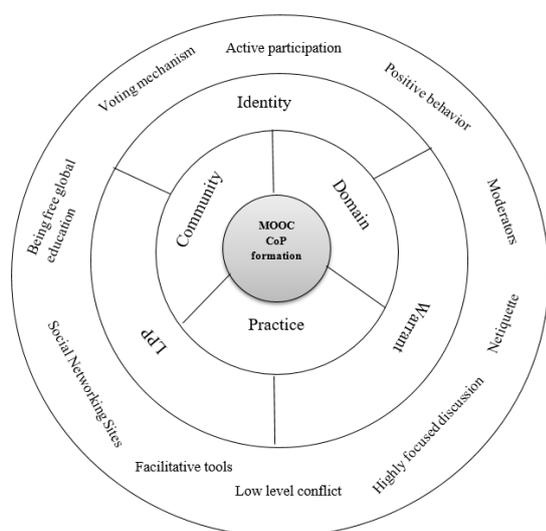

Figure 9 - Coursera Community Framework (CCF).

The Coursera community framework was developed to foster knowledge construction in Coursera's discussion forum based on the theory of CoP. The outer layer of this framework includes several features of potential CoP that generally make a community more focused, productive and energetic. These features are presented as drive for inner and middle layers' elements because these features' existence can develop community's focus, relationship and practice. It also develops elements that provide cohesion and give shape to a Coursera community. This framework emphasized the role played by outer layer. Given all structural elements in middle and inner layers through high score of outer layer's features develop a Coursera community as a CoP where knowledge can be constructed in addition to knowledge sharing. This framework rational is that community with high scores of these features is better candidate to develop a CoP and foster knowledge construction.

9. Conclusion

Coursera was studied from the CoP lens and resulted in the finding that there is the possibility of the Coursera MOOC being a CoP and fostering knowledge construction in the Coursera community. The data was examined in terms of domain, community, practice, identity, warrant and LPP. This resulted in the identification of the structural elements of a developing community within Coursera. The three layers was proposed in order to develop a Coursera community framework and to foster knowledge construction in MOOC communities. The first and second layers include the structural elements of CoP and the third layer includes emblematic features of potential community of

practice that generally make a MOOC community more energetic to construct knowledge. It provides insights in regard to the Coursera community and the possibility of a CoP being constructed within Coursera. It means Coursera needs to move from the information sharing phase to the knowledge construction phase.

10. Limitations and future research directions

In this study, the researcher interpreted each of participants' self-reported data. It means the researcher has described what the participants said in the interviews. In this study, the researcher analyzed the data by reference to the researcher's own understandings, in light of the researcher's background, experiences and social context and with consideration of the context of this community. Certainly, another researcher would conduct this study in a different way and the findings would be different because of their different experiences and understandings (Kulavuz-Onal, 2013).

This research was conducted as a netnographic study to understand the knowledge construction process and to study Coursera MOOCs by reference to the concept of CoPs. Although the results of this research cannot be generalized, they provide a rich description of the MOOC community. The result of this study cannot be generalized to other cases. Each individual in this study has their own perspectives and experiences with this community that would be difficult to generalize to all the members of this community.

There is a large volume of data available online. This study limited the data, the number of participants and the researcher's time in the field. This limitation helped the study to provide more focused interpretations.

In qualitative research, it is ideal to use purposive sampling. There was an initial plan to use purposive sampling in this study but it became apparent that the participants were not active. Thus, the study used convenience sampling based on active participants and those who were interested in participating in an interview. In this way, learners' familiarity with Coursera because of their participation and their interest to be involved in interviews can provide reliable data. The limitation connected with the fact that interviews were done only with active users of the Coursera forum can be explained through three rounds of data collection from three different courses. Also data saturation occurred during the analysis of data in the third round of data collection (interviews had been conducted with over 60 respondents). This study has pointed out the importance of a CoP to foster the knowledge construction and it has provided some analytical generalizations. The application of these analytical generalizations to other MOOC communities (xMOOC, cMOOC) is recommended as future work to refine and further clarify the knowledge construction phases in MOOCs.

This study has pointed out the importance of warrant mechanism in forming a CoP and also it has pointed to some mechanisms in Coursera MOOC. Another future work would be to conduct a study to establish warrant in a MOOC community.

Finally, another future topic would be to conduct a study to develop sense of belonging and trust in the MOOC community to be a CoP. Such a study would help to uncover practices in MOOCs and possibly construct knowledge.

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