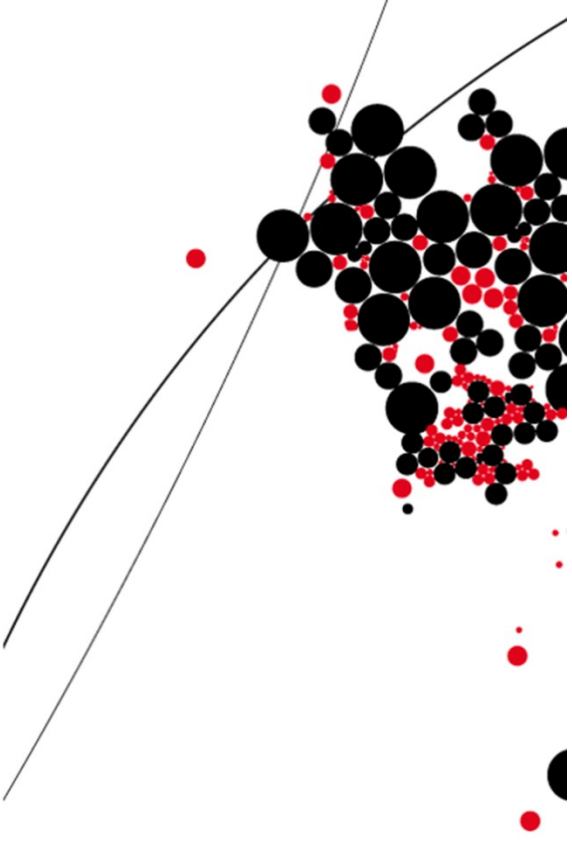# UNIVERSITY OF TWENTE.

Faculty of Behavioural, Management and Social sciences

Massive open online courses among Bengali-speaking people: participation patterns, motivations and challenges about data analysis

Master thesis

Student
Goutam Roy
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Supervisors
dr. Bas Kollöffel
dr. Henny Leemkuil

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Acknowledgement

Summary

Massive open online courses (MOOCs) are getting popular all over the world as it offers flexible learning opportunity from which personal and professional skills in various topics can be developed. Along with Australia, Europe, and North America, the popularity of MOOCs has already been observed in the Asian countries. Like English MOOCs, some Asian countries including Bangladesh, China, India, Japan, and South Korea have started MOOCs in their state language. However, very limited studies regarding participation patterns, motivations and completion status were found in the context of Asian languages including Bengali. The current study aims to explore the above-mentioned issues considering the context of Bengali MOOCs as evidence-based literature is missing in this area. Besides, this study purposes to find out the relationship between completion status and participation patterns and motivations in Bengali MOOCs. The descriptive survey research procedure was considered for this study and data was collected through an online survey. The registered students of four data analysis courses of the *Shikkhok* platform, which is the biggest among the Bengali MOOCs platforms, were considered as the sample. The data was analyzed using quantitative analysis process. The results showed that the rate of course completion in Bengali MOOCs was 32.5% and there was a positive and significant correlation between spending the time to learn the course and course completion. The study reveals that the post knowledge of the learners on the topic was higher than the prior knowledge. Moreover, the learners were motivated to learn from the Bengali MOOCs where self-directed learning and self-regulated learning motivation played a vital role. On the contrary, lack of time and deficiency of commitment to complete the course were two main factors for non-completion. Based on the result, the study mainly recommends redesigning the *Shikkhok* platform in an organized way like standard MOOCs platforms. Simultaneously, integration of discussion forum, assimilation of quiz and assessment system and providing certificate are other recommendations with the assumption that these procedural facilities could improve the current situation as the learners were already motivated to learn from the Bengali MOOCs.

Chapter 1. Introduction

Massive Open Online Courses (MOOCs) are comparatively a new way of learning and are getting popular to the educational organizations, teachers and students (Rieber, 2017), especially in higher education settings (Pursel, Zhang, Jablokow, Choi, & Velegol, 2016). It offers flexible learning atmosphere and unlimited access to the materials (Rieber, 2017). Besides, one of the intentions of MOOCs is to provide quality education either in free (Rieber, 2017) or in low-cost to many students at a time through the internet (Aboshady et al., 2015). Simultaneously, MOOCs are highly expected to meet the contemporary needs of higher education (Gooding, Klaas, Yager, & Kanchanaraksa, 2013), especially for the developing countries (Aboshady et al., 2015). People can learn various topics from MOOCs platforms in their suitable time and in a convenient way that can provide opportunities for developing skills which are available almost in all major languages. Mentionable, while some people show their interest in MOOCs for their personal skill development, some others start learning from such online platform for their professional development too.

Although learning online through MOOCs platforms is being popular (Zhang, 2016), studies showed that the completion rate in MOOCs is very low (Chen, 2013; Jiang, Williams, Schenke, Warschauer, Mark, & O'Dowd, Diane, 2014) ranging from 3-5% (DeBoer, Ho, Stump, & Breslow, 2014; Perna et al., 2014). Both technical and behavioural reasons might be responsible for that. In terms of technical aspects, limited technology access, computer literacy, difficult content and slower internet connection are the main (Aboshady et al., 2015) while lack of time, cultural and beliefs conflicts, participation pattern, satisfaction, motivation and language barrier are the key behavioural reasons (Aboshady et al., 2015; de Barba, Kennedy, & Ainley, 2016; Rieber, 2017). In these studies, participation pattern was discussed based on some specific factors such as learners' gender, age, spending time in the course, reasons for taking the courses, quiz attempts, assignments completion, changes of knowledge before and after taking the course, technical facilities, learners' expectations, and learners' experience during the course. Besides, motivation-related studies mainly dealt with learners' expectations to the course, their individual interests to enter and complete the course and influencing factors to complete the course. There are several studies which investigated the association between completion rate in MOOCs with the variables mentioned above. These studies found that both participation pattern and motivation are two strong predictors to influence students' performance which can stimulate the students to complete the course (Aboshady et al., 2015; de Barba et al., 2016; Mackness, Mak, & Williams, 2010; Pursel et al., 2016; Rieber, 2017; Xinyi, 2015a).

Research also showed that among the registered MOOCs students, 78% do not take part actively in their activities (Rieber, 2017) and thus, it is a matter of debate whether MOOCs should be defined as unsuccessful based on the completion rate. Many people do register to MOOCs without a commitment to complete it and DeBoer et al. (2014) named this as a 'shopping period'. Instead of calculating the drop-out rate based on the number of enrolment, DeBoer et al. (2014) suggested understanding the underlying reasons behind such low completion rate where some specific variables including participation patterns, motivations, technical issues etc. need to be considered for in-depth analysis. Other studies also support the previous statement as they found a strong association between completion rate and participation patterns and motivation (Aboshady et al., 2015; de Barba et al., 2016; Perna et al., 2014; Rieber, 2017; Zhang, 2016).

The previous discussion regarding participation patterns, motivations and completions status was done mainly from the various studies of English MOOCs. In a like manner, MOOCs are also getting popular to the people of the Asian countries as well as Asian language (Chen, 2013) including China, Hindi, Japanese, Korean, Bengali etc. languages. However, evidence-based findings regarding the MOOCs for the Asian languages are comparatively fewer, especially for the languages of the Indian sub-continent. For example, a rigorous literacy search was done to understand the participation patterns, motivations, completion rate and challenges in Bengali MOOCs. Unfortunately, no such scientific evidence was found. Bengali is the sixth most spoken language in the world ('List of languages by total number of speakers', 2018). As more than 21% learners of three big MOOCs platforms Udacity, Coursera and edX came from the Asian countries, therefore, it can be assumed that a large number of Bengali learners are also participating in the MOOCs platforms. As no such study was found where MOOCs are explored considering the Bengali context, therefore, this gap creates the scope to conduct

this research where participation patterns, motivations and completion situation can be investigated in Bengali language settings. It can be assumed that the completion status and its relation to the participation patterns and motivations in Bengali MOOCs might be similar with other studies, however, this is a matter of investigation. This gap inspired the current researcher to explore the participation patterns and motivations as well as to find out their relationship with the completion status in the Bengali MOOCs context.

Here, it is important to note that, unlike English-speaking MOOCs, such platform is not frequent in Bengali. Historic evidence revealed only three Bengali platforms which can be considered as MOOCs platform. The Shikkhok ('The teacher' in English) is the biggest where 65 courses are hosted ('Shikkhok', n.d.) and, as of 2015, this has more 700000 students (Kumar, 2015). Khan Academy is worldwide recognized ('Khan Academy', n.d.) and, along with some other languages, this platform has localized many courses from the English videos into the Bengali. This is the second highest online learning platform in Bengali. The third one is provided by the Assam University, India. They have the plan to provide 12 courses, however, currently, they are offering eight courses to their students ('Assam University', n.d.).

This study has the intention to compare the result with the study findings conducted by Rieber (2017) and de Barba et al. (2016). In his study, Rieber (2017) analyzed the participation pattern in MOOCs about statistics. Mainly, he discussed the learners' participation pattern and behaviour during taking the course with the help of some motivation-related factors. Furthermore, his study discussed the learners' opinion regarding access to that MOOC and also the quality of a MOOC. The reasons for non-completing the course were also discussed in his paper. Though he took a number of variables for his study, however, all the variables were not correlated with the completion rate. For instance, he analyzed the self-reported intentions of the participants, but these intentions were not compared between completers and non-completers. He mainly discussed the reasons for non-completion and argued about the term 'completion rate'. From the analysis of assessment participation, he identified that most of the students did not complete their assignment and therefore, he agreed with DeBoer et al. (2014) that most of the participants considered their MOOCs journey as a 'shopping period' which might be the best term to describe the participation pattern of the non-completers. However, though Rieber (2017) analyzed the participation patterns, he did not compare the status between completers and non-completers in most cases.

Similarly, de Barba et al. (2016) analyzed the reasons why people come to MOOCs. Whereas Rieber (2017) focused on the participation pattern, she considered the variables related to motivation as she discussed that a higher level of motivation could be an effective contributor to complete courses from MOOCs. She also considered some factors of participation patterns such as video hits and quiz attempt to understand the relationship between participation pattern and motivation. According to her study, motivation and participation were inter-related and among the motivations, situational interest was dominant. In her study, de Barba et al. (2016) discussed the four kinds of motivations such as Intrinsic Motivation (IM), Situational Interest, Self-Regulated Learning (SRL) and Self-Directed Learning (SDL). She only considered the learners who attempted for the final grade. Therefore, from her study, it was not possible to understand the difference between completers and non-completers regarding the issue of motivation.

As both of them considered the variables of participation pattern and motivations, therefore, the present study took the chance to consider these both so that a comparison can be possible. It is important to note that while Rieber (2017) focused on participation pattern and took some motivation related variable to understand the situation, de Barba et al. (2016) mainly considered the motivation-related variables but she took some variables of participation pattern.

As discussed earlier, there are lots of studies on participation pattern and motivations in MOOCs (de Barba et al., 2016; Gooding et al., 2013; Perna et al., 2014; Pursel et al., 2016; Rieber, 2017), this is still an area of investigation in Bengali MOOCs as such MOOCs platforms in the Bengali language are relatively new. The theoretical benefit of this study will be identifying the relation between participation pattern and motivation and course completion status in the context of a non-English MOOC setting. Besides, these findings can be compared with the status of established MOOCs platforms. Most of the studies are based on the English MOOCs as well as hold the advanced technological characters of the developed countries of Europe, North America or Australia. This study creates the scope to know the similarities as well as differences in the investigated issues between the

status of developed and developing countries. Furthermore, this study will help to provide a general and generalized understanding on Bengali MOOCs.

From the technical aspect, it is found that Rieber (2017) used the data for his study from 'a commercial for-profit eLearning software company' who used the Canvas learning management system (LMS). On the other hand, de Barba et al. (2016) used the data from a course offered by the University of Melbourne who is providing this course in Coursera platform. Both of these platforms are technically advanced. Comparing with these two, the *Shikkhok* was relatively poor regarding technical issues. This website used free and open sources technologies such as WordPress for hosting, Linux, free storage tools such as Dropbox, Vimeo etc. Unlike Coursera or commercial platforms, the website is simple, and some important features are missing. For instance, it has no mechanism to store the learners' learning log. The interaction between students and teachers was done through website comment system as well as the facebook comment system. While the participants of de Barba et al. (2016) and Rieber (2017) got the standard level of technical facilities, the learners of *Shikkhok* had to face some difficulties in this regard. Due to such technical barriers, it can be a matter of investigation that the learners of the *Shikkhok* platform could perform equally with those who are getting all high-end facilities. For instance, even after getting such facilities, the drop-out rate is still higher. But, in a poorer setting like *Shikkhok* platform, it can be assumed that the drop-out rate might not such higher if they are motivated enough. Besides, it also can be assumed that as the western world people are getting all facilities in their MOOCs and this inspired them to spend more time, the learners of Bengali MOOCs are also spending enough time because of motivation. These will be investigated in this study. Mentionable, this is the first of its kind in the Bengali MOOCs, therefore, this study will add specific knowledge in this area. Finally, the study can help the Bengali MOOCs platforms to understand their limitations as well as to identify the possible areas of improvement which can be considered as the practical study benefit.

In summary, it can be said that both participation pattern and motivation are two important areas which can be used to predict the completion rate in MOOCs. As the completion rate in MOOCs is very low, therefore, researchers often considered these two themes for their research to understand the learners' intentions to the completion. Some studies explained the participant's behaviour during the course based on their activities, whereas in some other studies, learners' internal motivation and external factors were discussed. The current study aims to explore the participation pattern and motivation considering the context of Bengali MOOCs.

The first chapter 1 of this study provides the general understanding of the investigated issues. Besides, it also explores the existing status of Bengali MOOCs and formulates the central problem. The motivation, context and background of the study are also discussed in this chapter.

Chapter 2 provides the theoretical basis of the study where the key issues such as MOOCs, participation patterns, motivations, completion rate and definition of the completion rate, and the context and the challenges in Bengali MOOCs are discussed. This chapter also provides the main and specific research questions.

Chapter 3 deals with the methods and research design used in this study. It provides the characters of the participants, study procedure, description about the instrumentation and data preparation and analysis process.

Chapter 4 provides the results of the study. The results of key variables relating to the completion status are presented in a visualized manner. Both basic and advanced statistical procedures are taken to explain the result.

Chapter 5 includes a discussion about the result of each research question. This chapter also presents the study limitation, specific recommendations, the scope for further research and then it concludes the paper.

Chapter 2. Theoretical framework

2.1 Massive open online courses

Massive open online courses (MOOCs) has already gained huge acceptance irrespective of gender, nationality, location, social status within a short time (Aboshady et al., 2015). It allows people to learn from the distance. However, unlike the traditional system, communication between teacher and students and among the students is different in MOOCs where communication through forum and discussion threads are the main. It is one of the flexible ways to continue the learning for those who dropped out from the study or want to improve specific skills from the distance or have the intention to continue study for personal and professional development. Many high-ranked universities e.g. Indiana University, Massachusetts Institute of Technology (MIT), Pennsylvania State University are offering online programs which can be considered as good examples of MOOCs (Song, Singleton, Hill, & Koh, 2004).

MOOC is divided into two categories—cMOOCs and xMOOCs. The first one is based on the connectivist and connective knowledge theory developed by George Siemens and Stephen Downes in 2008 (Duke, Harper, & Johnston, 2013). This theory focuses on internet and technology-based self-directed learning of the students, open-ended curriculum, freely available content and social networking (de Barba et al., 2016). On the other hand, xMOOCs take the fundamentals of cMOOCs, however, it mainly focuses on the combination of pre-recorded video content, quiz system, test or assessment etc. (de Barba et al., 2016). Structurally, xMOOCs have five specific features: pre-recorded content, start and end date, quiz and exercise, evaluation, and certification (Krause & Lowe, 2014; Vargas, 2014). In short, the difference between cMOOCs and xMOOCs is that while cMOOCs are community-oriented, xMOOCs are more teacher-oriented and similar to the traditional learning system (Zhang, 2016). The universities like Harvard, MIT, Stanford etc. provide cMOOCs to the students while Coursera, Edx, Udacity etc. are the examples of xMOOCs (Zhang, 2016).

One of the basic characteristics of MOOCs is it offers unrestricted contents and lectures to the learners and MOOCs can be used for the continuous education (Rieber, 2017). Particularly, it helps the professionals to learn a specific topic or subject from the internet at their convenient time. Because of this character, learning trends from such MOOCs platforms have been increasing in a significant manner (de Barba et al., 2016). Though one of the basics of MOOCs is providing free learning, however, nowadays, both paid and free courses are also available. In many cases, the xMOOCs platforms allow entire free learning opportunity to the learners, but they also charge some fee for the certification. For instance, learning statistics or other data analysis courses, anyone can learn the basics of these subjects from the Coursera without any cost, however, they charge some fee if the learners want to get a certificate of completion. On the other hand, though Rieber (2017) mentioned that it is possible to get unlimited access to MOOCs, some xMOOCs platforms are restricting this facility for the free learners. The paid learners can learn anytime but such opportunity for the free learners are being limited. Therefore, it can be said that xMOOCs have already been started to provide dissimilar experiences to the paid and free learners. This might be considered as the transition phase for the xMOOCs. During the era of free xMOOCs, the completion rate is very low (DeBoer et al., 2014; Perna et al., 2014; Rieber, 2017). Therefore, it might be going to be a matter of further investigation whether paid MOOCs could increase the completion rate.

The learners have been participating in MOOCs platforms from the different parts of the world (Chen, 2013) and English is the dominating language in this regard (Stratton & Grace, 2016). At the same time, some platforms are providing MOOCs in non-English language settings too. In most cases, the English MOOCs are translated into other languages (Mackness et al., 2010) and Khan Academy is one of the good examples of this. Currently, Khan Academy offers MOOCs in 26 languages including a number of Asian languages ('Khan Academy', n.d.). They are translating the English MOOCs into other languages with the help of the contributors of the respective native speaker. It is important to note that not all the MOOCs are rich as like as the English in Khan Academy platform. For instance, while the course number of Khan Academy is 59 for the English language, this number is only 10 for the Bengali language and five for the Hindi language ('Khan Academy', n.d.).

Like Europe and North America, learning from the MOOCs platform is also getting popular in the Asian communities. Chen (2013) calculated that, in Udacity, Coursera and edX courses, 35.2% of
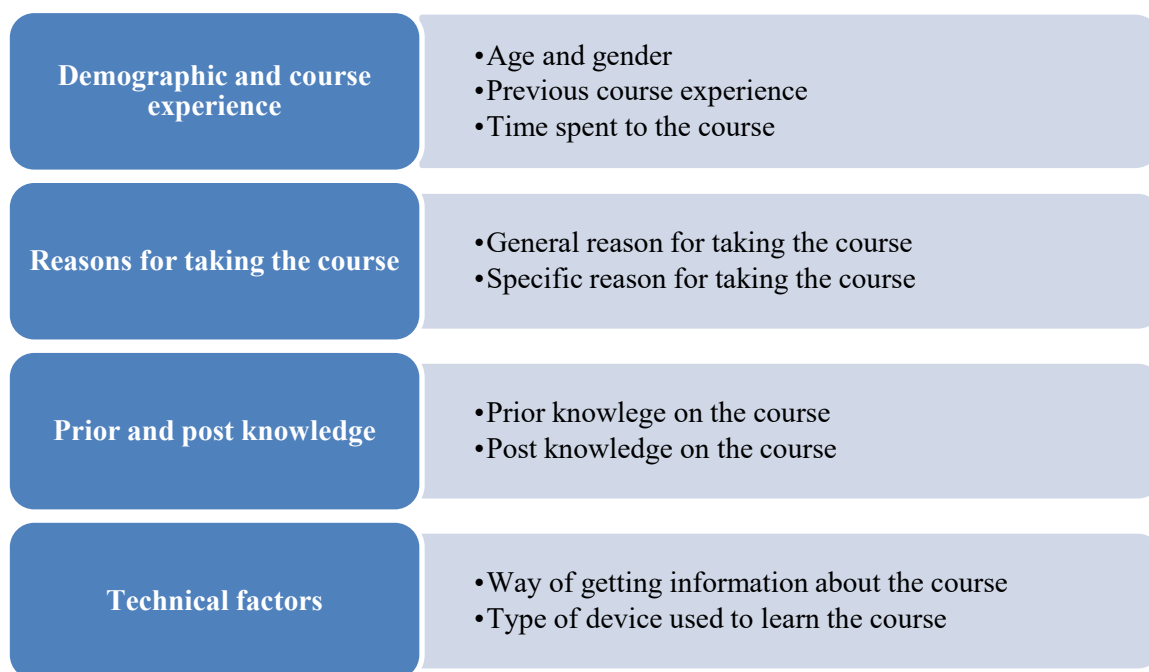
learners came from North America and 28.2% from Europe. Asia got the third position and 21.4% of learners from Asian countries participate in these three platforms. This result shows the level of enthusiasm of the Asian people in MOOCs. However, some Asian countries have also entered in the MOOCs recently in their own language. Xinyi (2015) provided some examples such as India started their Edukart MOOC platform, Schoo is popular in Japan, and China universities offered a number of courses in the Chinese language. Therefore, it can be concluded that, along with participating in English MOOCs, Asian people are also learning from MOOCs in their own languages.

2.2 Participation patterns in MOOCs

People of different age, gender, culture, education and social status participate in MOOCs. Therefore, their participation and behavioural pattern can vary. The participants' behaviour in MOOCs can depend on many factors such as situational interest and learning task (Rotgans & Schmidt, 2011), motivation, emotional and cognitive engagement (Sun & Rueda, 2012). In order to understand the participation and behaviour patterns, researchers considered some core elements such as interest and intentions of the participants, nature of participation, study environment, performance, engagement, assessment procedure, technical facilities and quality of content (Jiang, Williams, Schenke, et al., 2014; Qiu et al., 2016; Rieber, 2017). In specific, it can be assumed that participants can show different behaviour because of some technical and pedagogical elements such as nature of device, time spent in a week, study intention, prior knowledge, course quality, course content, participation in quiz, feedback, and personal communication with the teacher (Aboshady et al., 2015; Rieber, 2017).

The term 'participation pattern' contains a number of variables and there is no specific definition of this term. In many studies, the respective researcher set a specific domain to understand the participation patterns. For example, Gillani and Eynon (2014) and Poquet and Dawson (2015) defined the forum posting as a parameter of participation patterns. By analyzing various literature, Perna et al., (2014) gathered some aspects of participation patterns which include characteristics of the learners, enrolment and retention and scalability of initiatives. On the other hand, while Milligan, Littlejohn, and Margaryan (2013) discussed about time, goal-setting, planning for learning, education, experience of previous learning, demographic information; Romero and Usart (2014) focused on the some other variables such as time, activities in platform, discussion in forum, and learning logs. Furthermore, in the study conducted by Wang, Yang, Wen, Koedinger, and Rosé (2015) both the quantity of participation and on-task vs off-tasks participation patterns were discussed in which they included forum participation, course content, quiz, technical issues, self-introduction and social networking issues. Similarly, in the participation metrics, DeBoer et al., (2014) mentioned about a number of group variables such as general attendance by time, participation in lectures and quiz, assessment, click on the video, homework and forum post. Therefore, it is clear that different studies considered different variables to understand this participation pattern in MOOCs and this pattern can be varied based on the factors of core elements and technical and pedagogical factors. A number of variables of participation patterns were included in the study conducted by Rieber (2017), therefore, the selected variables constructed by him and which are relevant to the Bengali MOOCs were considered for the current study. It also can be mentioned that some other variables taken by Rieber (2017) were not considered in this study due to the limitation of the Bengali MOOCs platform. For instance, he analyzed the data of several assignments which is not considered here. This is because the *Shikkhok* platform does not process the assignment result and video hits of the learners. Therefore, considering all the limitations of Bengali MOOCs, only these variables were considered for this study which accessible. After counting the variables, a total of four groups of variables are found, and these are presented in Figure 1.

Demographic and course experience	• Age and gender • Previous course experience • Time spent to the course
Reasons for taking the course	• General reason for taking the course • Specific reason for taking the course
Prior and post knowledge	• Prior knowlege on the course • Post knowledge on the course
Technical factors	• Way of getting information about the course • Type of device used to learn the course

Figure 1. The variables of investigation regarding the participation pattern used in this study.

In his study, Rieber (2017) analysed the reasons for joining a MOOC and also explained their learning and participation pattern during taking the course. The reasons for successful course completion, as well as the challenges, were also discussed. To explore these, he included three main themes such as the assessment attempts of the learners, participants self-reported intentions for their course participation and MOOC design and reasons for the non-completion. For analysis, he considered a number of variables including demographic information, completion of the assessment, learners' perception and motivation and technical facilities. As he found the completion rate was low, he analysed the reasons for non-completion based on the opinion of the learners and recommended to consider the more flexible learning setting based on the participants' intentions and demands. Besides, he also discussed the existing way of calculation of completion rate which might provide the wrong assumption regarding this rate. As many people joined in MOOCs but did not continue their learning journey, therefore, the way of completion rate calculation might be an issue of rethinking. Instead of learners' learning activity, their opinion got more importance to draw the conclusion of his study.

The variables presented in Figure 1 are constructed from his study. In the present study, the demographic information of the learners will help to understand the background of the learners participating in Bengali MOOCs while their previous course experience can express their knowledge changes after completion of the course. Besides, the variable time spent on the course can show the participants' interest in the course. Whereas participants' intentions and motivation in taking the course can be described through the general and specific reasons, their prior and post knowledge can explore the effectiveness of the learning through MOOCs. Finally, the technical factors will show how the participants used these in their learning journey. All of these variables can be used to understand the existing situation of Bengali MOOCs as well as to find out whether there is any difference between the participation pattern of completers and non-completers.

2.3 Motivation in MOOC

In MOOC, the motivation of participants is also important to join and to complete the course. The definition of motivation is also widespread. Kleinginna and Kleinginna (1981) considered motivation as a general consensus which is mainly internal. By reviewing 102 definitions about motivations, they also found out some specific categories of motivations such as the internal mechanism of the learners, functional process which considered energizing and directing involvement and psychological factors. However, the researchers worked with both motivation and MOOC stated that,

in general, motivation is a complex process in learning (de Barba et al., 2016; Pursel et al., 2016; Yang et al., 2006). Studies showed a positive relation between participants' motivation and course completion in MOOC (de Barba et al., 2016; Pursel et al., 2016; Sun & Rueda, 2012; Yang et al., 2006). de Barba et al. (2016) discussed that a higher level of self-regulated motivation is vital to complete the course successfully. The term self-regulated motivation holds three aspects such as students' personal approach in planning, monitoring and updating the cognition, learners' control on own effort to learning, and cognitive strategies of the learners to learn and understand the content (Pintrich & Groot, 1990). Although the idea of motivation is complex, still this is one of the influencing factors regarding the success of a MOOC (de Barba et al., 2016). Pintrich (2003) mentioned five constructs of motivations such as the personal interest of the participants, goals, self-efficacy, value beliefs, and control beliefs (as cited in de Barba et al., 2016).

Motivation is mainly divided into two major parts: intrinsic and extrinsic. Among these, participants' interest, value beliefs, and goals can be considered as intrinsic motivation while the rests are extrinsic. The personal interest is also divided into two perspectives – individual and situational. While students want to develop their personal skills in a specific topic is considered as an individual, however, students can be affected by the outer environment which is situational (Hidi & Harackiewicz, 2000). There are a number of studies where it was found that value beliefs were correlated to students' performance (Yang et al., 2006) and situational engagement was also positively related with the students' engagement in MOOC (Sun & Rueda, 2012). Here, value belief refers to the learners' own perception to the academic activities whether these are important to them and situational engagement deals with the participants' motivation in state-level (de Barba et al., 2016).

Not all the elements of motivation are similarly correlated with the MOOC. Motivation and MOOC are associated in two ways. Firstly, people start their learning in MOOC because of their personal strong motivation (de Barba et al., 2016) and secondly, course completion has the relationship with a number of motivational factors (Hidi & Harackiewicz, 2000). Regarding enrolment, Sun & Rueda (2012) stated that there is a strong relationship between motivation and engagement in MOOC and learners' intellectual, behavioural and emotional engagement are three key elements of motivation for enrolment. On the other hand, for the context of course completion, de Barba et al. (2016) established that both intrinsic motivation and situational interest has the positive effect on completing the course. As motivation is considered as a complex and critical factor to understand the learning process (de Barba et al., 2016; Yang et al., 2006) and there are several aspects of motivation, therefore, the mentioned previous studies did not consider all the elements of motivation in a single study. For instance, while Sun and Rueda, 2012; Yang et al. (2006) worked with intrinsic motivation, self-efficacy and individual belief to understand the learning approach in MOOCs, de Barba et al. (2016) particularly gave emphasis on intrinsic motivation and situational interest.

Like motivation, learners' perception of the quality of a MOOC is another aspect which is generally discussed with the elements of motivation. Zheng, Rosson, Shih, and Carroll (2015) discussed three issues together such as students' motivation, behaviour and perception in MOOCs as all these three are associated with each other. According to them, these three altogether influenced the learners and there is a relation between these aspects and retention rate. They also gave emphasis to consider motivation and perception together because both of these can help to understand the participants' behaviour in completing a MOOC. In the current study, the researcher considers all four key elements of motivation as well as the perception factors related to motivation. The perception factors include learners' own assessment of the course, areas of interest, willingness to learn and perception of giving efforts. After a review, it was found that the above-mentioned perception factors are aligned with the sub-themes of motivations designed by de Barba et al. (2016). As a result, the four motivation components such as Intrinsic Motivation (IM), Situational Interest (SI), Self-Regulated Learning (SRL) and Self-Directed Learning (SDL) are considered for this study which also can explain the perception of the learners to the course. The elements and sub-elements of the motivation are presented in Figure 2.
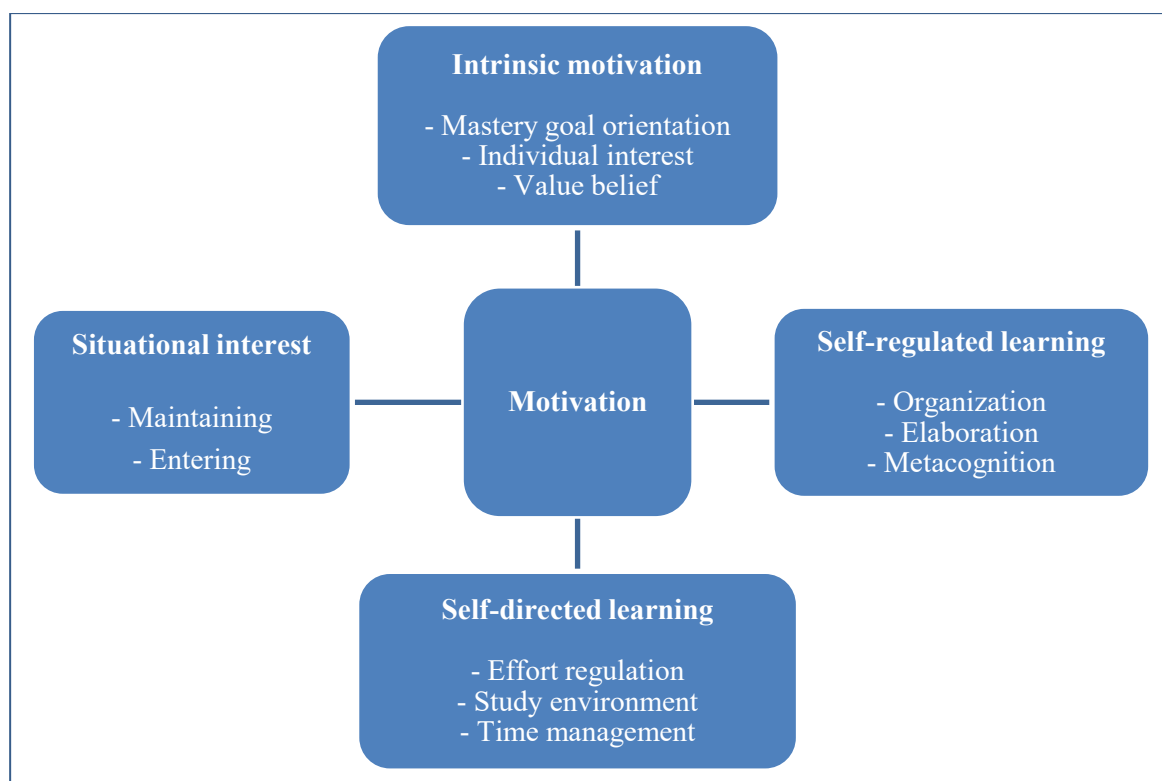
Figure 2. Aspects of motivation and components of each aspect developed by de Barba et al. (2016).

It is necessary to note that participants were willing to learn from the MOOCs. Rieber (2017) presented that most of the participants wanted to complete the course while joining. However, after then, due to a number of reasons they did not continue their study. Among these reasons, the shortage of time was the main. The participants also gave emphasis to the quality of MOOCs. According to them, video tutorials, narrated video presentations, and the personality of the course instructor were the major reasons for course completion. On the other hand, de Barba et al. (2016) found that motivation of the learners was influenced by their participation and participation also influenced by the motivation. Both of these two themes contributed to each other for a successful MOOC completion. Among the sub-themes of motivations presented in Figure 2, SI had the major effect on course completion.

2.4. Completion rate and definition of completion in MOOC

Different studies showed different completion and dropout rate in MOOC. In most studies, it was found that the completion rate in MOOC is very low. DeBoer et al. (2014) mentioned that the range of the completion rate from 5% to 12%. From the study conducted by Jordan (2014), the completion rate was found 6.5%, however, based on the findings from other literature, she concluded that the typical completion rate was 5% which is aligned with the findings of DeBoer et al. (2014). In contrast, comparatively a higher level of completion rate (18.4%) was found among the medical students (Aboshady et al., 2015). All of these calculations were done based on the registered learners in a specific course who finally either were graded or got a certificate from the learning platforms. The above numbers show that although a number of students started their learning in MOOC, very few of them completed it and therefore, the dropout rate was very high.

Due to the different nature of the online platforms regarding the participation process, the researchers were thinking about the definition of the completion rate whether it is providing the actual scenario of completion rate. Gathering from the various platforms, Jordan (2015) presented eight definitions of completion such as 'earning a certificate', 'completed a course', 'passed a course', 'completed assignments', 'memorably active participants', 'took final exam', 'kept up in whole course' and 'active contribution in a course'. Among these, the 'earning a certificate' was the dominating as most of the learning platforms considered this as a sign of course completion. Only if the enrolment

number is considered to calculate the completion rate, then the completion rate would be lower. DeBoer et al. (2014) reported that about 30% of registered learners never clicked on the learning courses. A similar finding was also found in the study of Jordan (2015) Therefore, DeBoer et al. (2014) argued that whether only the enrolment can be the primary based to calculate the completion rate. He set a definition of the learners as "informed commitment to complete the course". This commitment includes a regular visit to the course, attend the quiz, participate in the forum etc. It is important to note that such calculation is possible if there is a mechanism to find out the learning log of every activity of the learners. For the current study, as such mechanism was missing, therefore, the calculation of completion rate will be calculated based on the self-reported statements of the participants who registered in the *Shikkhok* learning platform. The key question will be asked whether they 'completed the course' or not.

2.5 The context and the challenges of Bengali MOOCs

It is discussed earlier that people from the Asian countries are showing their interest to learn from the MOOCs (Chen, 2013). It can be assumed that such interest is also growing among the Bengali-speaking people. Bengali is one of the most used languages in the world ('List of languages by total number of speakers', 2018) and it is usual that, along with their regular education, Bengali-speaking people may show their interest to learn a specific topic or subject through online learning. Worldwide MOOCs are used to improve the personal and professional skills and Bengali-speaking people might not be the exception.

Interestingly, evidence-based information regarding the participation of the Bengali-speaking people was not found. The researcher himself searched for literature including journal articles, book chapters, conference papers etc. to know the current situation of MOOCs among the Bengali-speaking people. Besides, such information was also missing regarding Bengali MOOCs. Bengali-speaking people can participate either in English MOOCs or in Bengali MOOCs or in both, however, research-based evidence in both areas is still missing. Therefore, it is difficult to know the existing situation of Bengali-speaking people regarding their participation in MOOCs. Similarly, it is also undiscovered why Bengali-speaking people are participating in MOOCs and what kind of challenges they are facing.

The first MOOC in the Bengali language was started in August 2012. A professor working in the computer science field at the University of Alabama in Birmingham Dr Ragib Hasan established the *Shikkhok* (Teacher) platform ('Shikkhok', n.d.). It is observed from the course hit and from the number of registered users that this platform got huge acceptance to the Bengali-speaking people. This platform provides free courses to the learners and the popularity of the platform has been increased within a short time among the Bengali-speaking people. For developing an online learning model with very low cost and popularity, this platform got four awards such as Google Rise Award, The Information Society Innovation Fund award and The BOBs User Award in 2013 and Internet Society Community Grants in 2014. Till date, this platform hosted a total of 65 courses and the academicians and professionals from different areas are providing these courses ('Shikkhok', n.d.). The second MOOC platform in the Bengali language is Khan Academy. It is one of the renowned platforms worldwide for online learning. The platform extended its area in the Bengali language by translating the English contents to the Bengali language. A group of volunteers participated in the translation works, however, the number of the courses is still small ('Khan Academy', n.d.). The platform is the Assam University of India which provides a few courses to their students in the Bengali language ('Assam University', n.d.). The first two platforms are the examples of xMOOCs in the Bengali language while the last one can be considered as a cMOOC.

Learning from the distance education using radio and television is not new to the Bengali-speaking people, however, learning from the online platforms is comparatively new. The interest of people has been increasing to learn from online. An example can be placed here in support of the statement. The courses C Programming, Android application and Object-Oriented Java were viewed 132,822, 111,714 and 105,955 times respectively in the *Shikkhok* platform ('Shikkhok', n.d.). Besides, Bengali people showed their interest to translate the content from English to the Bengali language ('Khan Academy', n.d.) which can be considered another indicator of their interest to MOOCs. Not only in Bangladesh, such content translation activities were also seen among the Bengali-speaking people in India (Beaven, Comas-Quinn, Hauck, De los Arcos, & Lewis, 2013). Furthermore, web-based collaboration learning has also been started among the Bangladeshi students (Islam & Rahman, 2014). All of these examples show a grown interest to the learning from the online platforms. As Bangladesh

gave emphasis on educational transformation through information and communication technology (Khan, Hasan, & Clement, 2012), therefore, it can be assumed that online learning, particularly, MOOCs are going to be more popular among Bengali-speaking people.

Another important thing is that though English is taught in the Bangladeshi schools from the primary level, there is a lack of proficient teachers to teach English (Mahmud & Bray, 2017). The learners are heavily dependent on the extra English learning from the private tutors (Mahmud & Bray, 2017). This situation shows the emergence of learning from Bengali content. As learning culture from the online has been growing, therefore it can be assumed that learning from the Bengali MOOCs will also be more widespread due to the language barrier.

Due to lack of research, the existing status of Bengali MOOCs is not known. Therefore, it is difficult to know what Bengali-speaking people are performing in MOOCs and in which level. It is also difficult to understand demographic characters of Bengali-speaking people who are participating in MOOCs. Besides, their motivation in participating in MOOCs is still unknown. It also can be assumed that like other MOOCs, the participants of Bengali MOOCs are facing some challenges to complete the courses from MOOCs. What are these challenges? The present study creates the scope to know the evidence-based information regarding the raised issues for the first time. In summary, the study will help the Bengali MOOCs in two ways. Firstly, it will provide research-based information about Bengali MOOCs and will contribute to add specific knowledge in this area. Secondly, this will help the MOOCs platforms to understand their strengths and limitation from which they can get some ideas for their further development.

2.6 Research questions

Based on the analysis of the theoretical framework chapter and considering the Bengali MOOC context, the following research question was formulated:

1. How are participation pattern and motivation related to the course completion status in MOOCs among the Bengali-speaking people?

To answer the main research question, the following specific sub-research questions are needed to be answered:
1. What are the participation patterns of the Bengali-speaking people in MOOC?
2. To what extent are motivation and perception related to the course completion?
3. What are the existing challenges regarding participation pattern and motivation in Bengali MOOC which triggers the learners for not completing the course?

Chapter 3. Methods

3.1 Research design

The main purpose of the research is to explore the participation patterns, motivations and challenges of learners in the Bengali MOOCs. The descriptive survey research procedure was considered for investigation because this kind of research allows to get the answers to the research questions in a descriptive manner and to make the findings generalized (Lodico, Spaulding, & Voegtle, 2010). The study is also relational as it is going to determine to what extent two or more variables such as course completion status, participation patterns and motivations are related (Lodico et al., 2010). The study is partly cross-sectional because one of the research questions deals with the comparison between two groups who completed the data analysis courses and who did not. Furthermore, this study is quantitative in nature and online survey was carried out for data collection, however, two open-ended questions were included in the survey instrument.

3.2 Participants

To select the participants for this study, among three Bengali MOOCs, the *Shikkhok* was chosen. The researcher himself reviewed all three platforms and found that the *Shikkhok* provides the maximum MOOCs features to the learners, however, it has some limitations too. This platform offers free-of-cost courses to the Bengali-speaking people in both basic and advanced level on various subjects. As the *Shikkhok* offers maximum facilities, hence, this platform was selected purposively with the assumption that the findings could be compared with other standard MOOCs. However, while Rieber (2017) worked with the Statistics students, de Barba et al., (2016) considered the students from the background of Macroeconomics and both the subjects deal with mathematics and data. For this reason, the data analysis courses such as Python, R, SAS and Statistics of the *Shikkhok* were considered for this study.

A total of 3,065 learners were registered in the data analysis courses in the *Shikkhok* MOOC platform. After a careful checking, it was found that some learners registered without a valid email address. Therefore, an invitation email to participate in the survey was sent to a total of 2,377 learners; 958 to Python learners, 222 to R, 354 to SAS and 843 to Statistics learners. However, Qualtrics reported that a total of 122 emails were bounced, and 136 emails were duplicate. Therefore, the exact number of sending email was 2,119. Among them, 211 participants started the survey, but only 119 completed it and the rests 92 partial responses were excluded from the analysis. Therefore, the complete response rate of completing for the survey was 5.62%. Among the 119 participants, two did not provide their consent to participate in the survey. Hence, the total number of respondents of the survey was 117 (41 from Python, 27 from R, 3 from SAS and 46 from the Statistics course) and their information will be analyzed in the next parts. Studies show that, for an online-based survey, the complete response rate is very low (Petrovčič, Petrič, & Lozar Manfreda, 2016), and it ranges from 3-5% (DeBoer et al., 2014; Perna et al., 2014) to less than 10% (Daniel, 2012) which is aligned with this study response rate. However, for the case of investigating connections between variables, low response rate does not create any result-bias (Rindfuss, Choe, Tsuya, Bumpass, & Tamaki, 2015). In their cross-sectional survey and examining the relationship between variables including behavioural and attitude, they used different kinds of tests such as chi-square, analysis of variance (ANOVA), logistic regression for both univariate and multivariate analysis and they did not find any bias for the low response rates.

It is important to note that there were no exclusion criteria and all the registered users of data analysis courses with a valid email address were considered as sample for this study. It was, preliminary, targeted to collect data, at least, from 50 participants regardless of their age, gender and educational background. This number, as a rule of thumb, allows establishing the relationship between the studied variables (Wilson Van Voorhis & Morgan, 2007). In order to measure the group differences such as course completers and non-completers, 30 participants for each cell size with 80% power can be considered reasonable standard size to do significance test (Wilson Van Voorhis & Morgan, 2007). However, finally, the number of responses reached 117 which is much higher than the targeted. This will allow the researcher to establish the relationship with a smaller error.

The ethical permission was taken from the faculty's ethics committee of the University of Twente. The purpose of the study and specific ethical consent were placed in the questionnaire and the

participants were asked to provide their consent. They were requested to participate in the survey voluntarily. To ensure the anonymity, their name and other personal information excluding gender and age were not asked.

The analysis shows that maximum (41.6%) participants were either undergraduate or post-graduate students followed by the data analyst or related professionals (21.7%). Furthermore, 12% teachers from primary to university level did registration to learn data analysis. Among the participants, 87.2% had a bachelor or higher degree and the rests had, at least, secondary education. No participant was found who had below secondary education. Gender analysis shows that more than 85% of the participants were male and 13.7% were female. Most of the participants came from the 25-34 age range (53%) followed by the 18-24 age group (23.9%).

3.3 Instrumentation

The instrument of the study was made based on the two previous study instruments conducted by Rieber (2017) and de Barba et al. (2016). The questions in relation to demographic information, participation pattern and challenges were taken from Rieber (2017) and motivation-related questions were excerpted from de Barba et al. (2016). However, some questions were customized to align with the Bengali language and educational context. For example, for the question 'What is your highest level of education?', Rieber (2017) put some answers including 'Some college, but have not finished a degree', 'Completed 2-year college degree', and 'Completed 4-year college degree'. These answers are related to college-level education. Instead, in this study, the options for the highest level of education were specified according to the hierarchy system of the education in Bangladesh. In Bangladesh, some colleges offer 'Higher secondary education' and 'Bachelor's degree' while some other colleges offer 'Master's degree' too. Therefore, the above-mentioned options used by Rieber (2017) were not feasible regarding Bangladesh education. This is an example of adaptation. Most of the questions were close-ended, however, two questions related to strengths and limitations of Bengali MOOCs were open-ended.

There were two main sections in the instrument. In the first section, the questions related to participants demographic information, technical ability, self-expectations from the course, self-assessment of prior knowledge and perceptions of quality in an online course were asked. The second section holds the questions regarding the reasons for completion and non-completion of the course including motivation of the students. There were total 28 questions in the instrument. Among these, 19 items were common for all. Five questions were extra for participants who completed their course and the rests four for them who did not complete. The instrument was, first, made in English and then, it was translated into Bengali so that the participants were free to choose in which language they want to respond. This is because the participants did not feel any language barrier during answering the questions. The translated version of the instrument was re-checked by a lecturer of the University of Twente whose native language is Bengali. As he is from Bangladesh, so he is aware of the education system of Bangladesh. He was also requested to check the instrument whether this was aligned with the context. The English instrument is given in the Appendix. It is important to note that, among 117 participants, only 16 used the English version in the survey while the rests used the Bengali version. Besides, while they provided their opinion in the open-ended questions, only two of the course completers and four non-completers wrote their answers in Bengali languages.

To reach the participants, an online survey platform named Qualtircs was used. The major benefit of using the online survey is it helps to reach to the participants easily and quickly. On the other hand, the disadvantage of this procedure is that participants can overlook the request and there is a little scope to motivate them. However, the duration of data collection was 15 days and the estimated response time was maximum 10 minutes.

Reliability, as well as the internal consistency of the items, has been calculated for each of the sub-sections using the Cronbach's alpha analysis procedure. The Cronbach's alpha for the sub-section which contain 10 items regarding willingness and interest was 0.838. The sub-sections regarding perception on course quality and factors of course completion consisted of 9 items each were also highly reliable ($\alpha = 0.916$ and $\alpha = 0.944$ respectively). The Cronbach's alphas for the 6 items for the factors of successful course completion, 5 items for the motivation of success and 12 items for the factors for non-completion were 0.912, 0.858 and 0.930 respectively. Therefore, it is established that the instrument items for individual sub-sections were highly reliable to measure the research questions. However, it

was not possible to measure the whole item-reliability because some sub-sections were only for the course completers while some others were for the drop out learners and their combination was not feasible. A complete overview of the reliability of the items is given in Table 1.

Table 1.

Cronbach's Alphas for Each of the Group of Statements with the Number of Question Items

Group of statements	Number of items	Cronbach's alpha (α)
Participants' willingness and interest to learn the course	10	0.838
Perception of quality in an online course	9	0.916
Participants' perception who completed the course	9	0.944
Factors for being able to successfully complete the course	6	0.912
Participants' motivation in completing the data analysis course	5	0.858
Participants' perception who did not complete the course	12	0.930

3.4 Procedure

An email was sent to the registered users of data analysis courses who had a valid email address through Qualtircs platform. The email addresses were collected from the *Shikkhok.com* database with the support of the platform authority. An informational summary of the study purpose and confidentiality issues was placed in the email. The participants were requested to fill up the questionnaire at their convenient time with assuming that it would take maximum 10 minutes. The duration of the survey was 15 days from the starting date, however, after 10 days, a reminder email was sent to those who did not complete the survey. The settings of the survey were set in such a way that after the specific time, the link would not work, and it was not possible to record their further responses. Those who did not complete the survey within the given time, their responses were recorded as partial response and did not consider for the analysis.

To obtain a high response rate, a support was asked for from the *Shikkhok* authority. The researcher requested the *Shikkhok* authority and the respective course teachers to inform their students about the survey. One course teacher helped in this regard. He informed his students about the survey and requested them to participate. A thank-you message was placed at the end of the survey. The general study findings will be shared with the *Shikkhok* authority after the completion of the study.

3.5 Data preparation and analysis

After completion of the survey, the filtered data set who had completed the survey was downloaded to the SPSS format. The whole data set was divided into three specific sections. The first section consists of the data of both the completers and dropped out students. The data in the second section deals with the information of those who completed the data analysis course. And, in the third section, the data of non-completers was compacted accordingly. While downloading the whole data set to the SPSS format (.sav), a number of irrelevant data were found in the SPSS file such as 'StartDate', 'EndDate', 'RecordDate', 'Progress', 'LocationLatitude', 'LocationLongitude' etc. All of these irrelevant columns were removed from the final SPSS file. Only the columns related to the question-items and ResponseID was kept for further data analysis. For some advanced level analysis, data was recoded and computed according to the nature of the specific statistical procedure.

For quantitative data, descriptive statistics including measures of central tendency, measures of variability and standard deviation were considered. The non-parametric tests were used to answer the questions because it allows the flexibility as well as a distribution-free test (Anderson, 2001). Furthermore, the study consists of lots of ordinal, nominal, dichotomous data and Likert scale, and thus, the non-parametric test is considered as suitable for the study (Agresti, Franklin, & Klingenberg, 2017). As the main dependent variable is dichotomous, and the independent variables are either nominal and ordinal, therefore, cross-tabulation was used to know the participation patterns. Besides, in order to examine the correlation between the variables bivariate analysis by measuring the Pearsons R was done.

While the main dependent variable is 'completion status', the independent variables are 'motivations', 'technical facilities', 'education level', 'age', 'gender', 'prior knowledge', 'students' expectation', 'time management', 'perception on quality', and 'reason for completion/non-completion'. Furthermore, to know the relation between completion status and motivation, the Spearman correlation was calculated. As there were a number of Likert-scale items, these were analyzed both in the group and as a single statement. For instance, while the data were analyzed to know the overall motivational factors in relation to the course completion status, all the Likert-scale items were placed in a group and then analyzed. This strategy was taken in order to compare the MOOCs status with the findings of de Barba et al. (2016). In contrast, while this analysis is for the participation pattern, single statements were analyzed and compared with the findings of Rieber (2017). Mentionable, the missing variables were handled carefully so that these cannot provide wrong analysis. For instance, the two persons who denied participating in the survey, their rows were deleted from the SPSS file. For all these quantitative analyses, the IBM SPSS Statistics 22 software were used.

The participants had the scope to provide their opinion in the open-ended questions. Some of them provided such answers which were not related to the question. For instance, when they were asked, 'What was the strong point of this course?', some of them wrote 'N/A', 'Nothing to say', 'No comment', 'your survey questions are too many. this is boring' etc. Such type of answers was also found in the other three open-ended questions. Among the 38 completers, 36 provided their opinion about the strong points of the courses while all of them answered the question: "How could it be improved?" For 79 dropped out students, all of them provided their answer for both the open-ended answers. Some of them provided multiple responses to these open-ended questions.

The participants who provided their answers in Bengali was translated to the English language by the researcher. After then, the five steps coding process were be followed to create themes as described by Creswell (2012) which includes: 1. primary reading of qualitative data, 2. classifying exact objective-based text, 3. cataloguing the text and generating categories, 4. reducing overlapping and 5. model or theme creation. Mentionable, in the survey, there were two open-ended questions for the participants who completed the course. Similarly, two other open-ended questions were there for the participants who did not complete the course. Figure 3 shows the flowchart of how data will be analyzed for the open-ended questions.
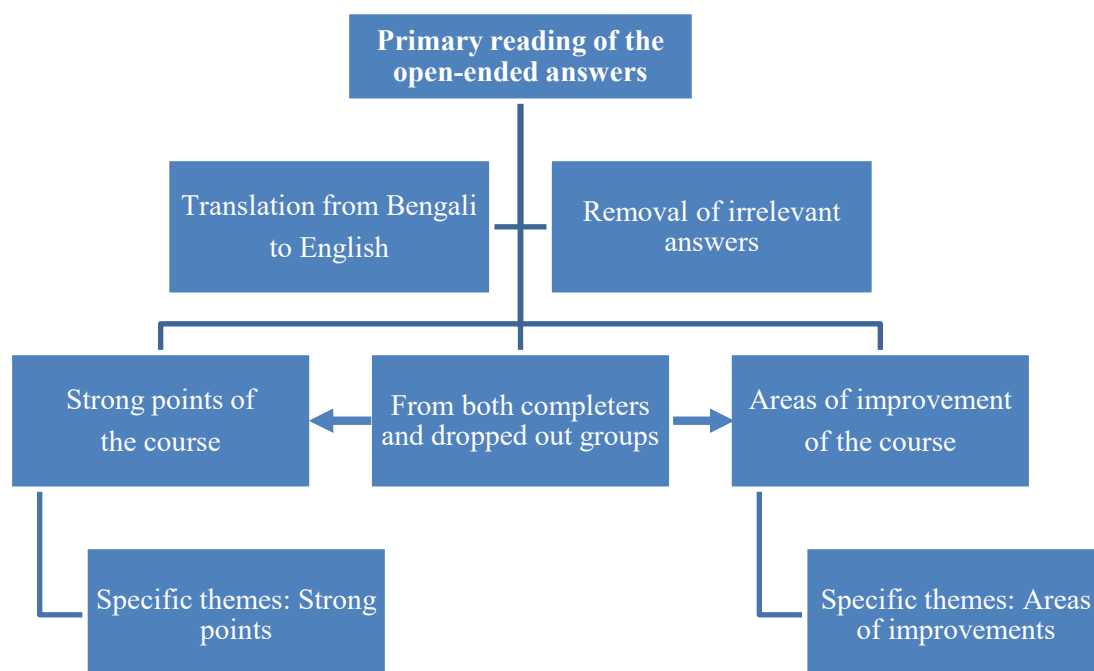
Figure 3. The flowchart illustrates the coding and theme creation process for the open-ended questions.

The themes created by manual coding were listed according to the importance given by the survey participants. It was found that there were in total three specific themes for the strong points and six specific themes for the areas of improvement (Figure 4). The themes for the strong points are 1) language, 2) course design, and 3) teacher and teaching method. On the other hand, the theme for the areas of improvement are: 1) content, 2) assignment, quiz and practice, 3) teacher and teaching method, 4) course design, 5) interaction, and 6) technical. The themes 'course design' and 'teacher and teaching method' were found in both groups. The result from the open-ended responses is presented in two ways. The responses for both strong points and areas of improvement of the course were compared between the two groups who completed the courses and who did not. Besides, these responses were also compared among the three courses such as Python, R and Statistics. The responses of the SAS students were not considered due to the low number of responses.
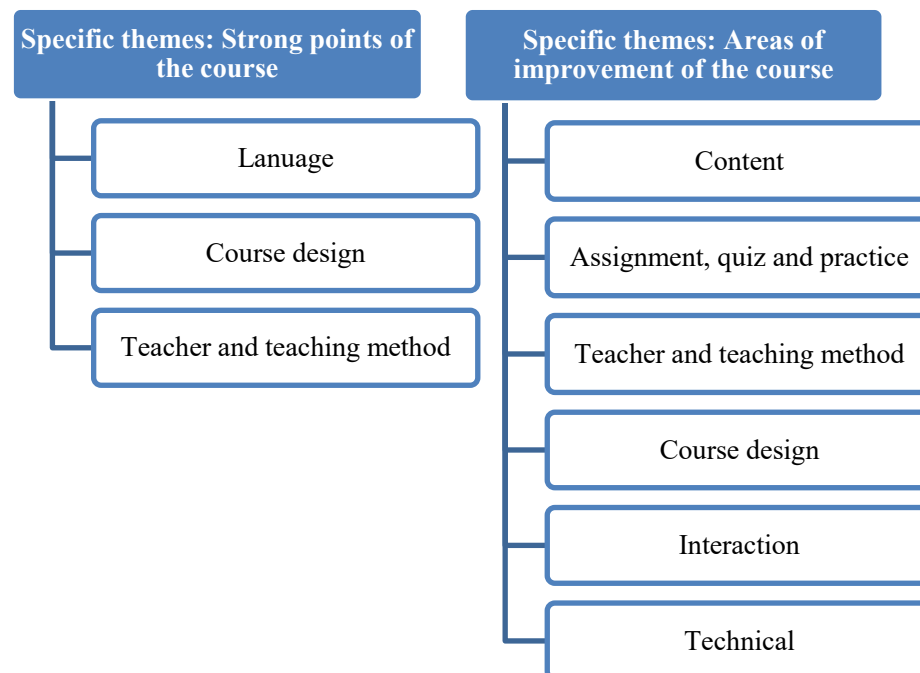
Figure 4. The flowchart presents the themes of strong points and areas of improvement of the course.

Chapter 4. Results

4.1 Participation patterns in the Bengali MOOCs

The first research question aimed to investigate the participation patterns in the Bengali MOOCs. This question consists of a number of variables given in Figure 1. The following results have been analyzed accordingly.

Understanding the completion status regarding gender, age, previous course experience and time spent in the course

Among the participants who completed the survey, 32.5% of them fully completed the course while 67.5% of them were not able to complete the course. The frequencies which were cross-tabulated in Table 2, no significant relationship between gender and course completion status was found, $\chi2$ (2, N = 117) = 2.50, p > .05.

Table 2

Crosstabulation of Gender and Course Completion Status

Did you complete the course	Gender			$\chi2$	df	p
	Male	Female	Prefer not to say			
Yes	33	4	1	2.50	2	.287
No	67	12	0			
Total	100	16	1			

Among the age groups, Table 3 shows that most of the participants came from the 25-34 age range followed by the 18-24 age group. However, the relation between age groups and completion status was also not statistically significant, $\chi2$ (3, N = 117) = 2.62, p > .05.

Table 3

Crosstabulation of Age Range and Course Completion Status

Did you complete the course	Age groups				$\chi2$	df	p
	18-24	25-34	35-44	45-54			
Yes	10	19	9	0	2.62	3	.455
No	18	43	14	4			
Total	28	62	23	4			

There was a question to know whether the participants learnt the similar course earlier from another platform. Table 4 reports that most of the participants from both completers and non-completers groups did not take the similar course from another platform. However, the frequencies of the variables presented in the Table 4 were not statistically different, $\chi2$ (1, N = 117) = 0.08, p > .05.

Table 4

Crosstabulation of Similar Course Taken in Another Platform Earlier and Course Completion Status

Did you complete the course	Similar course taken in another platform		$\chi2$	Df	p
	Yes	No			
Yes	14	24	0.08	1	.777
No	27	52			
Total	41	76			

It was tried to understand whether there was any relation between spending the time to learn the course and the completion status. The frequencies cross-tabulated in the Table 5 show that there is a significant relationship between these two variables, $\chi2$ (3, N = 117) = 18.07, $p < .001$.

Table 5

Crosstabulation of Time Spent to Learn the Course and Course Completion Status

Did you complete the course	Time spent to learn the course				$\chi2$	df	p
	Less than 1 hour	Between 1 and 2 hours	Between 2 and 3 hours	More than 3 hours			
Yes	6	16	13	3	18.07**	3	.000
No	44	22	10	3			
Total	50	38	23	6			

**$p < 0.001$

Reasons for taking the data analysis course

Two questions—one for the general reasons and another for the specific—were asked to the participants to know the motive for taking this data analysis course. For these questions, they were allowed to select multiple answers. Regarding the general reason, Table 6 shows that a total of 168 responses were found. Majority of them reported that they wanted to learn about the subject or topic which was the 50.6% of all participants who responded, and this was 72.6% of all the answers given for this reason. This is the highest among all the reasons. The participants wanted to gain skills for a career opportunity which was the second most important reason. 55 of them selected this option and this was 47.0% of all the answers given.

Table 6

General Reasons for the Learners for Taking the Data Analysis Courses

What was your general reason for taking this course?	Responses		
	N	Percentage	Per cent of cases
Learn about the subject	85	50.6%	72.6%
Be part of a community of learners	14	8.3%	12.0%
Complete the course	10	6.0%	8.5%
Gain skills for a career opportunity	55	32.7%	47.0%
Others	4	2.4%	3.4%
Total	168	100%	143.6%

For the specific reason, Table 7 indicates that most of the participants (N = 78) took this course for personal or professional development. The highest 47.0% of the participants considered this point as an important aspect which was 66.7%% of all the answers. The reasons 'Refresh my understanding of that course' and 'Begin to use data analysis in my workplace' were considered the second and third reason respectively.

Table 7

Specific Reasons for the Learners for Taking the Data Analysis Courses

What was your specific reason for taking this course?	Responses		
	N	Percentage	Per cent of cases
Begin to use data analysis in my workplace	37	22.3%	31.6%
Refresh my understanding of that course	46	27.7%	39.3%
Personal or professional development	78	47.0%	66.7%
Others	5	3.0%	4.3%
Total	166	100%	141.9%

Prior and post knowledge of the respondents

A difference between prior knowledge and post knowledge of the participants was calculated. Findings from the descriptive statistics show that prior knowledge for both groups was almost in similar level but the post knowledge was higher among the completers (pre-and-post mean difference = 1.40) than the non-completers (pre-and-post mean difference = 0.55). A repeated measures Analysis of Variance (ANOVA) was also done to understand whether the change was significant. Table 8 presents that the difference between the means of prior knowledge and post knowledge was statistically significant ($p = 0.000$).

Table 8

Test of Within-Subject Effects regarding Prior and Post Knowledge

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
knowledge	Sphericity Assumed	40.209	1	40.209	44.724	.000
	Greenhouse-Geisser	40.209	1.000	40.209	44.724	.000
	Huynh-Feldt	40.209	1.000	40.209	44.724	.000
	Lower-bound	40.209	1.000	40.209	44.724	.000
Error(knowledge)	Sphericity Assumed	104.291	116	.899		
	Greenhouse-Geisser	104.291	116.000	.899		
	Huynh-Feldt	104.291	116.000	.899		
	Lower-bound	104.291	116.000	.899		

Technical issues

Table 9 shows the results of how the learners were informed about the data analysis course. Among the 143 responses, the highest 51 reported that they were informed about the course from the social media sites which is the 35.7% of all participants and 43.6% of all the answers given for this question. The second highest participants knew about the course from the web search (35.9% of the cases) followed by the way 'from a friend or colleague' (24.8%).

Table 9

How the Learners Know about the Data Analysis Courses

How did you hear about these courses	Responses		
	N	Percentage	Per cent of cases
Through a social media site	51	35.7%	43.6%
From a news story	10	7.0%	8.5%
From a friend or colleague	29	20.3%	24.8%
From an ad in the web	6	4.2%	5.1%
From a web search	42	29.4%	35.9%
From the instructor	5	3.5%	4.3%
Total	143	100%	122.2%

From the Table 10, it was found that, among the 142 responses, 101 participants used desktop or laptop (windows) to learn the course which is 71.1% of the responses and 86.3% of all answers given for this question. Learning from the android phone placed second position (19.7% of all answers).

Table 10

Type of Device Used to Learn the Data Analysis Courses

What device did you use to learn the course?	Responses		
	N	Percentage	Per cent of cases
Desktop or Laptop (Windows)	101	71.1%	86.3%
Desktop or Laptop (Apple)	7	4.9%	6.0%
Android Phone	23	16.2%	19.7%
iPhone	2	1.4%	1.7%
Android Tablet	2	1.4%	1.7%
iPad	2	1.4%	1.7%
Others	5	3.5%	4.3%
Total	142	100%	121.4%

Triggers for successful completion and completion predictor

The participants who had successfully completed the course were asked to provide the reasons for their success. According to the scale, the lower mean provides the most important reason. The Table 11 reports that 'The course's overall organization and design' was the main reason to complete the course followed by the 'Narrated video presentations of the course content' and 'Personal interest in the topic'. The reason 'Help and support from other participants' got the lowest position in this regard.

Table 11

Reason for the Success to Complete the Course

Statements	*M*	*SD*
1. The course's overall organization and design	2.37	1.38
2. Narrated video presentations of the course content	2.42	1.46
3. Help and support from other participants	2.87	1.42
4. Personal interest in the topic	2.42	1.24
5. External reasons such as needing to know this information for my job	2.63	1.26
6. The personality of the instructor as represented in the course materials	2.50	1.13

Note. 1 = Extremely important, 2 = Very important, 3 = Moderately important, 4 = Neutral, 5 = Slightly important, 6 = Low important, 7 = Not important at all

To know the factor which can influence the completion rate, a logistic regression analysis was done where completion status was the dependent variable (dichotomous) and six variables such as education level, gender, age group, learning similar course from another platform earlier, spending time in a week to learning the course and prior knowledge to the topic were in the independent variable (either nominal or ordinal variable). This logistic regression model was found statistically significant $\chi^2(6) = 16.303$, $p < .005$. Table 12 shows that, among the independent variables, only 'spending time in a week' is statistically significant which indicates that increasing spending time was associated with a successful completion status. Odds of completing the course is 2.25 times for an hour increase in time spent in a week.

Table 12

Regression coefficients

Independent variables	B	S.E.	Wald	df	Sig.	Exp(B)
Education level	.152	.321	.225	1	.636	1.164
Gender	-.062	.568	.012	1	.913	.940
Age group	0.39	.370	.011	1	.915	1.040
Learning similar course from another platform earlier	-.060	.458	.017	1	.896	.942
Spending time in a week	-.810	.238	11.607	1	.001**	.445
Prior knowledge to the topic	-.041	.153	.073	1	.787	.959
Constant	1.963	1.598	1.508	1	.219	7.112

Note. Codes for the dependent variable: Did not complete = 0, Complete = 1, **$p < 0.001$

4.2 Motivations and perception in Bengali MOOCs

The second research question was: To what extent is motivation related to the perception of learners and their course completion status? In order to get the answer to this question, a total of 10 statements related to motivation was given to the participants. Table 13 presents that the mean of the statements. The statement 1 'I wanted to learn as much as possible from the course' and statement 2 'I have always been fascinated to learn this course' of the completers were lower than the non-completers. Both of these motivation statements are under IM. For the rest eight cases, the mean motivation of the completers was higher than the non-completers. On average, the motivation level of the completers was higher than the non-completers.

Table 13

Comparison of Motivation of the Learners Between Course Completers and Non-completers

Statements on motivation	Completers		Non-completers	
	M	*SD*	*M*	*SD*
1. I wanted to learn as much as possible from this course.	5.63	1.44	5.73	0.94
2. I have always been fascinated to learn this course.	5.55	1.31	5.65	1.00
3. I was excited when I started the course.	5.92	1.17	5.75	1.18
4. I found the content of this course to be personally meaningful.	5.74	1.00	5.61	0.98
5. When studying for this course, I went through the videos and my notes and tried to find the most important ideas.	5.47	1.13	5.00	1.41
6. When studying for this course, I pulled together information from different sources, such as videos, websites, and forum/discussion board.	5.37	1.44	4.78	1.69
7. When studying for this course, I tried to determine which concepts I did not understand well.	5.24	1.24	4.97	1.36
8. I had a regular place set aside for studying.	4.79	1.49	3.99	1.75
9. I made a good use of my study time for this course.	5.05	1.47	4.22	1.70
10. I thought this course was going to be interesting when I started.	5.89	1.11	5.86	0.97
Average	5.47	0.91	5.16	0.80

Note. 7 = Strongly agree, 6 = Agree, 5 = Somewhat agree, 4 = Neither agree or disagree, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree

Mann-Whitney U test was run to compare the significant differences between the completers and non-completers. Table 14 shows that significant differences were found in statement 6, statement 8 and statement 9. While statement 6 is under SRL, the rest two statements are the representative of SDL.

Table 14

Mann-Whitney U Test to Compare the Differences Between Course Completers and Non-completers

Statements on motivation	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
1. I wanted to learn as much as possible from this course.	1446.50	4606.50	-.34	.74
2. I have always been fascinated to learn this course.	1479.50	4639.50	-.13	.89
3. I was excited when I started the course.	1360.50	4520.50	-.87	.39
4. I found the content of this course to be personally meaningful.	1375.00	4535.00	-.82	.411
5. When studying for this course, I went through the videos and my notes and tried to find the most important ideas.	1210.00	4370.00	-1.79	.07
6. When studying for this course, I pulled together information from different sources, such as videos, websites, and forum/discussion board.	1158.50	4318.50	-2.06	.04*
7. When studying for this course, I tried to determine which concepts I did not understand well.	1334.50	4494.50	-1.02	.31
8. I had a regular place set aside for studying.	1118.50	4278.50	-2.27	.02*
9. I made a good use of my study time for this course.	1085.50	4245.50	-2.47	.01*
10. I thought this course was going to be interesting when I started.	1436.00	4596.00	-.41	.68

Note. $*p < 0.05$

The descriptive statistics presented in Table 15 reports that the participants got the highest mean for the SI followed by IM, SEL and SDL respectively. Besides, to determine the relationship among the four motivations, a Spearman's rank-order correlation was run. The IM had the positive but moderate and significant correlation with the SI. Such moderate correlation was found between SRL and SDL. Though the IM was positively and significantly correlated with the SI and SRL, however, these relationships were poor. The similar poor relationship was found between SI and SDL.

Table 15

Descriptive Statistics and Spearman Correlation for All Elements of Motivation

Measure	1	2	3	4	M	SD
1. Intrinsic motivation	—	.493**	.364**	.264**	5.66	0.83
2. Situational interest		—	.326**	.225*	5.84	0.94
3. Self-regulated learning			—	.466**	5.06	1.16
4. Self-directed learning				—	4.37	1.58

Note. $*p < 0.05$, $**p < 0.001$

Another calculation was done in order to find out the differences among the courses using the Kruskal-Wallis test. Table 16 presents the findings of the differences between three courses such as Python, R and Statistics. In this calculation, the course SAS was not included due to the low number of participants. It was found that, among the 10 statements, only the statement 5 was significant between minimum one pair of groups.

Table 16

Comparison of Motivation of the Learners Between Courses

Statements on motivation	Sig.
1. I wanted to learn as much as possible from this course.	.40
2. I have always been fascinated to learn this course.	.74
3. I was excited when I started the course.	.38
4. I found the content of this course to be personally meaningful.	.46
5. When studying for this course, I went through the videos and my notes and tried to find the most important ideas.	.01*
6. When studying for this course, I pulled together information from different sources, such as videos, websites, and forum/discussion board.	.52
7. When studying for this course, I tried to determine which concepts I did not understand well.	.16
8. I had a regular place set aside for studying.	.30
9. I made a good use of my study time for this course.	.42
10. I thought this course was going to be interesting when I started.	.05

To find out the specific pair groups in which the difference was found, Dunn's post hoc test with Bonferroni adjustment was run. The pairwise comparison results of Dunn-Bonferroni test for each pair of groups showed in Table 17 that the differences between R-Python and R-Statistics groups were significant which was not true for the Python-Statistics group.

Table 17

Pairwise Comparison for the Statement 5 Between the Three Courses

Sample 1-Sample 2	Test statistic	Std. error	Std. test statistic	Sig.	Adj. Sig.
R-Python	20.15	7.75	2.60	.009	.028*
R-Statistics	-21.74	7.58	-2.87	.004	.012*
Python-Statistics	-1.58	6.72	-.24	.814	1.00

The participants were asked to mention the strong points of the course which motivated them to participate in the course. This was an open-ended question and based on their answers, three themes such as *language*, *course design*, and *teacher and teaching method* were formulated. Under the *language* theme, both the completers and non-completers pointed out about the importance of the 'content in Bengali' language as the strong point. 'Free learning opportunity' under *course design theme* was also considered as a strong point by both groups. For the last theme titled *teacher and teaching method*, 'well-prepared teacher' and 'easy to understand the lesson' were chosen by both completers and non-completers groups. The other reasons which helped the participants of both groups are pointed out in Figure 5 which shows that while the completers mentioned eight strong points, the non-completers indicated nine points. The bold points were mentioned by both groups.

Theme: Language
Content in Bengali
Using simple words
Easily readable content

Theme: Course design
Free learning opportunity
Instructions in the Bengali language
Descriptive and narrative presentation
Organization of the course
Mixing of video with text narration
Courses provided by the professionals

Theme: Teacher and teaching method
Well-prepared teacher
Explaining capacity of the teacher
Step by step explanation
Easy to understand the lessons

Learners' opinion who completed the course

Learners' opinion who did not complete the course

Figure 5. Strong points of the course which help to motivate the participants by completers and non-completers.

The learners of all three courses mentioned almost similar strong points presented in Figure 6. All three groups pointed out the 'content in Bengali', 'well-prepared teacher' and 'easy to understand the lessons' as the main strong points. Besides, they also said that 'free learning opportunity', 'instructions in the Bengali language', 'descriptive and narrative presentation' etc. were the main strong points of the courses.

Figure 6. Strong points of the course which help to motivate the participants by subjects

4.3 Challenges in Bengali MOOCs

The third research question deals with the existing challenges in Bengali MOCC considering both the participation pattern and motivation which triggers the learners for not completing the course. For this, the participants who did not complete their course were asked to provide the reasons. From the 101 responses, Table 18 reports that the highest 56 participants said, 'I did not have enough time to complete the course' which is the 55.4% of all participants who responded and 70.9% of all the answer given for this reason. The reason 'I only intended to browse or casually check out the course' got the second position (13.9% of percent of cases) for not completing the course followed by other two reasons 'The time needed to complete the course was greater than I expected' and 'The course did not my expectation' (equally, 11.4% for all the answer given for the question).

Table 18

Specific Reasons of the Learners for Not Completing the Course

What was your specific reason for not completing the course?	Responses		Per cent of cases
	N	Percentage	
1. I did not have enough time to complete the course.	56	55.4%	70.9%
2. The time needed to complete the course was greater than I expected.	9	8.9%	11.4%
3. I only intended to browse or casually check out the course.	11	10.9%	13.9%
4. My goal was never to complete the course.	6	5.9%	7.6%
5. The time I was told I needed to spend on the course was less than I was willing to commit.	5	5.0%	6.3%
6. The course did not meet my expectations.	9	8.9%	11.4%
7. I did not like the design of the course.	3	3.0%	3.8%
8. The course was too demanding.	1	1.0%	1.3%
9. The course was not demanding enough.	1	1.0%	1.3%
Total	101	100%	127.8%

Table 19 shows that the learners of all three courses mentioned the reason 'I did not have enough time' as the main reason for not completing the course. For the Python learners, the second reason was also related to the time in which they expressed that the time for course completion was higher than their expectation. The R learners mentioned that they wanted to browse or casually check the course which got the second position. According to the Statistics students, the course did not meet their expectation which was selected as the second highest reason by them.

Table 19

Specific Reasons for Not Completing the Course by Subjects

What was your specific reason for not completing the course?	Python	R	Statistics
1. I did not have enough time to complete the course.	59.5%	58.3%	48.7%
2. The time needed to complete the course was greater than I expected.	16.2%	4.2%	5.1%
3. I only intended to browse or casually check out the course.	8.1%	16.7%	10.3%
4. My goal was never to complete the course.	0.0%	8.3%	10.3%
5. The time I was told I needed to spend on the course was less than I was willing to commit.	2.7%	8.3%	5.1%
6. The course did not meet my expectations.	5.4%	4.2%	15.4%
7. I did not like the design of the course.	5.4%	0.0%	2.6%
8. The course was too demanding.	2.7%	0.0%	0.0%
9. The course was not demanding enough.	0.0%	0.0%	2.6%

From the experience of the learners about the statements regarding course design, it was found that the mean for the non-completers was lower than the completer group in all statements (Table 20). However, the Kruskal-Wallis test did not find any significant difference in any of the learning experience statement between the completers and non-completers. Moreover, no significant difference was found in the Kruskal-Wallis test of the three subjects such as Python, R and Statistics.

Table 20

Experience of the Learners about the Course Design

Learning experience statement	Completers		Non-completers	
	M	*SD*	*M*	*SD*
1. The course met my expectations.	5.05	1.43	4.76	1.37
2. The course was effectively organized.	5.34	1.26	5.06	1.24
3. Assignments and activities were clearly related to the course goals.	5.11	1.59	5.09	1.05
4. Assignments and activities were useful for helping me learn.	5.21	1.26	5.03	1.23
5. New skills and concepts were presented in ways I could understand.	5.42	1.08	5.01	1.19
6. This course challenged me to think and learn.	5.29	1.27	5.09	1.11
7. The time I was told to expect to devote to the course was accurate.	5.18	1.35	4.85	1.15
8. The instructor was knowledgeable and well-prepared.	5.63	1.30	5.30	1.18
9. The instructor was open to students' questions and comments.	4.87	1.65	4.62	1.26

Note. 7 = Strongly agree, 6 = Agree, 5 = Somewhat agree, 4 = Neither agree or disagree, 3 = Somewhat disagree, 2 = Disagree, 1 = Strongly disagree

In an open-ended question, participants mentioned six areas of improvement where they emphasized on the *content* theme which includes four specific areas: 1) more lessons, 2) more meaningful examples, 3) advanced level content and 4) updated content. Under the theme *assignment, quiz and practice*, both groups mentioned 'more quiz and assignment' as an important area. 'Clear explanation of the contents' under the theme *teacher and teaching method* was important to both groups. Besides, they thought that 'more video instructions' under *course design* and 'interaction between teacher and students' under the *interaction* theme were other areas of development. The non-completers provided the *technical* theme where they stated about video and website quality issues. Figure 7 shows that while the completers group mentioned 14 areas of improvement, this number for the non-completers was 18.
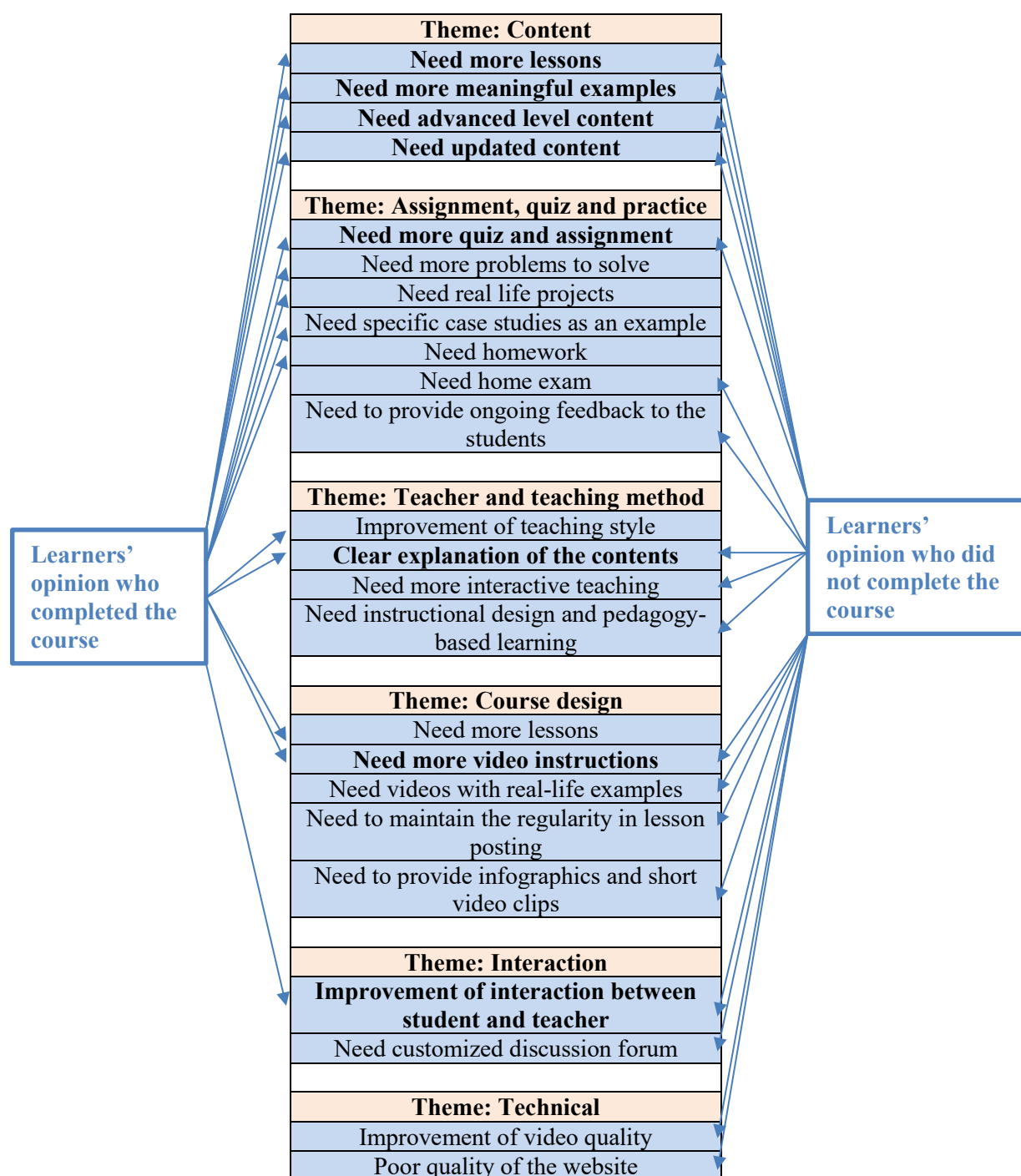
Theme: Content
Need more lessons
Need more meaningful examples
Need advanced level content
Need updated content

Theme: Assignment, quiz and practice
Need more quiz and assignment
Need more problems to solve
Need real life projects
Need specific case studies as an example
Need homework
Need home exam
Need to provide ongoing feedback to the students

Theme: Teacher and teaching method
Improvement of teaching style
Clear explanation of the contents
Need more interactive teaching
Need instructional design and pedagogy-based learning

Theme: Course design
Need more lessons
Need more video instructions
Need videos with real-life examples
Need to maintain the regularity in lesson posting
Need to provide infographics and short video clips

Theme: Interaction
Improvement of interaction between student and teacher
Need customized discussion forum

Theme: Technical
Improvement of video quality
Poor quality of the website

Learners' opinion who completed the course

Learners' opinion who did not complete the course

Figure 7. Areas of improvement according to the opinion of the participants by completers and non-completers.

Figure 9 presents the opinion of the participants regarding areas of improvement by the courses. All three groups mentioned the needs for updated lessons and providing meaningful examples. Besides, they wanted more quiz and assignments. While the learners of Python and R mentioned the poor quality of the website, the R learners specifically mentioned the quality of the video which was needed to be improved. Such points were not found for the learners of the Statistics, however, Statistics learners focused on maintaining the regularity in lesson posting. The other major areas of improvement are given in Figure 8.
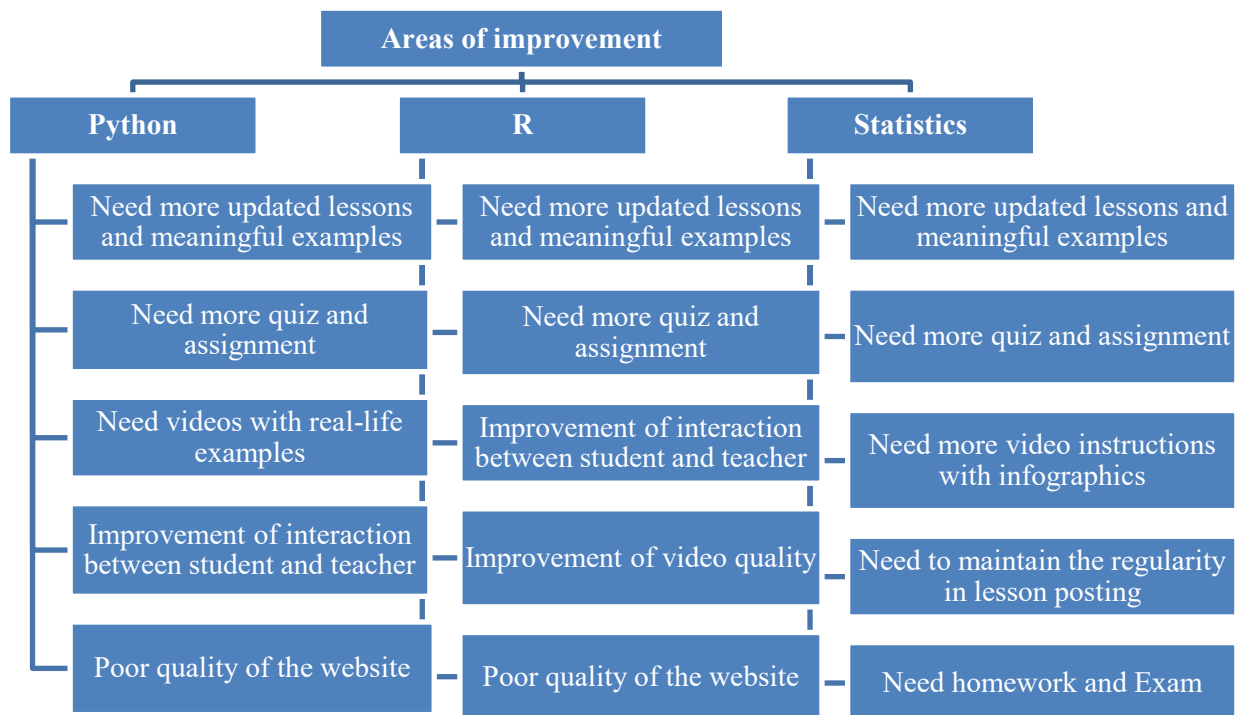
Figure 8. Areas of improvement according to the opinion of the participants by courses

Chapter 5. Conclusion and discussion

5.1 Conclusion and discussion

The study purpose was to explore the participation patterns and motivations of the learners of Bengali MOOC and to establish the relationship of these variables with the completion status. The first research question focused on the participation patterns and while the second one aimed to understand the motivation of the learners. Finally, the third one tried to find out the challenges for not completing the MOOC. The next part of this section is going to discuss the findings, to compare with the other studies and to draw a conclusion. The practical recommendations and scope for the future studies will also be discussed.

Research question 1. What are the participation patterns of the Bengali-speaking people in MOOCs?

To answer this research questions, a number of variables were taken for investigation. The study did not find any association between completion status with gender, age and previous similar course learning experience. Male participants were participating more than the female which is similar to the study of Jiang, Williams, Warschauer, He, and O'Dowd (2014). From the study of Hone and El Said (2016), they did not find the significant relationship between gender and completion rate. In contrast, Kaveri, Gunasekar, Gupta, and Pratap (2015) found both gender and age as significant predictors for a successful MOOC. Regarding age, both Hone and El Said (2016) and Kaveri et al. (2015) found that the mean age of the learners 24 or lower while this number was the 34 for the current study. From this result, it can be assumed that as the mean age of the Bengali learners was higher, this might have the influence for non-completion. Regarding the previous learning experience who took the similar course, no significant correlation was found with the completion status. It can be assumed that those who had taken the course previously from another platform (as referred higher knowledge group), they had more knowledge than those who did not take (as referred lower knowledge group). In this regard, a dissimilarity was found between this study and the study done by Jiang, Williams, Warschauer, et al., (2014). The later one found that the learners with lower knowledge had the higher chance than their counterparts to complete the course. However, while Rieber (2017) found the completion rate as 11.4%, this was 32.5% for this study. This rate is much higher than his study. A possible reason for this might be considering the assessment attempts. His participants had to go under total eight assessments which were missing in this Bengali MOOC. If the Bengali MOOCs participants had to participate in such an assessment procedure, the completion rate might be lower.

A positive correlation was found between the completion rate and spending the time to learn the course. Both the Chi-Square test and logistic regression confirmed that spending more time to the course can predict the increases in the chance of completion. Most of the learners spent less than two hours per week and this result is aligned with the data from most of the countries including the United States, India, Brazil, Mexico, Canada etc. (DeBoer & Stump, 2013). This result is also aligned with the findings of Rieber (2017). He concluded that the higher participation in the assessment was positively related to higher completion rate. This can be considered as the equivalent of spending more time to the courses could bring the result of higher completion rate in Bengali MOOCs.

It was tried to understand the reasons for taking this course. Learners of Bengali MOOCs mainly wanted to learn the topic of subject particularly to gain skill for their career opportunity. They specifically mentioned that they took the course because they wanted to develop their personal and professional skills. This finding is supported by the result of the study of Rieber (2017). It also can be assumed that the scope of working in the area of data analysis is increasing which motivated them to take the course. This result is also aligned with the statements of the motivations which will be discussed in the second research question. Here, it can be stated that the job market in Bangladesh has been competitive day-by-day and an advanced level skill in a specific domain can be an asset for a person. It might be a vital factor to learning courses from Bengali MOOCs.

The findings support the assumptions that learners' knowledge has been increased because of participating in the courses. Both completers and non-completers could improve their knowledge compared to their prior knowledge. Those who completed the course have gained more than those who

did not complete. A similar result was found in the study conducted by Konstan, Walker, Brooks, Brown, and Ekstrand (2015). This result shows that completing a course can be fruitful regarding gaining knowledge and it can help them to develop their respective skills.

The learners were familiar with the internet and devices. Most of the learners knew about the courses from social media websites like as Facebook, Twitter etc., and many of them were informed about this course from the web search. Most of the learners learnt this data analysis using the desktop computer or laptop of Windows operating system, however, a number of them learned it using an Android phone. These findings show that they were habituated in handling the technical issues. They also provided some suggestions on how to improve the platform regarding technical aspects. No one mentioned that they had faced technical problem during learning the course. Interestingly, the internet speed in Bangladesh is not good but no participant mentioned it as an excuse for non-completion or they did not mention this issue as areas for improvement. From this, it can be said that the videos posted on the *Shikkhok* platform in such a way that the learners did not face any difficulty.

Those who completed the course were asked to mention the reasons for their success. The main reason they mentioned was related to the course design and overall organization of the course. Their interest in the topic and narrative video presentations were other two important reasons for completing the course. These reasons were aligned with some other study findings (Hone & El Said, 2016; Kaveri et al., 2015; Rieber, 2017). These findings show that the overall organization of the course satisfied the primary demands of the learners.

In summary, it was found that among the four groups of variables (see Figure 1), spending time to the course has the significant positive correlation with the chance of increased completion status in Bengali MOOCs. However, the findings also reveal that the learners' knowledge has been increased from the data analysis course. Most of the variables of this section have no significant relationship with the completion status, however, these findings can be used in order to understand the existing status of Bengali MOOCs by using the descriptive statistics. For instance, from the findings, it is possible to understand what type of devices were used by the learners during learning these courses. This descriptive finding could also help the MOOCs platforms to redesign their platforms. Similarly, it is also possible to know the gender gaps in participation in Bengali MOOCs.

Research question 2. To what extent are motivation and perception related to the course completion?

The learners were, in general, motivated to the course. The completers were more motivated than the non-completers. Among the statements on motivations, the completers group showed the higher motivations than their counterparts and the difference was found significant in SDL and in a part of SRL between the groups. On the other hand, R learners were significantly motivated more than the Python group and less than the Statistics groups in a specific statement of SRL. A possible explanation for this finding might be Statistics is used worldwide by both job holders and academicians and it is especially important for the students who have the interest to a higher degree by research. Besides, this subject is taught in both college and university level but there is a lack of Bengali content of this subject. This was a scope for them to learn Statistics from a Bengali instructor in the Bengali language. However, though it is possible to apply the knowledge of statistics by both R and Python, Python is still considered as programming language than data analysis while R is being popular in the academic. This might be a reason for finding more motivation among the R students than the Python learners. The primary intention of the non-completers was they wanted to learn as much as possible and they also were very much fascinated to the course. In contrast, due to some reasons including spending time in a regular manner, course design and concepts and ways of learning, the non-completers were not able to show high motivation on other three elements of motivation. Similar findings were found in the study conducted by Rieber (2017). This might establish the result that people generally showed similar motivation irrespective of language, culture, gender and age during entering the course. Besides, their habit of spending time did not vary as their level of motivation remained at the same level.

Among the four elements of motivation, the study finds that IM has the highest significant positive correlation to the SI which is similar to the findings of de Barba et al. (2016). While de Barba et al. (2016), in most cases, got positive but moderate level relationship between the motivations, this relationships for this study were either in moderate or in poor level. Video hit and quiz attempts might be two factors for such moderate relationship for de Barba et al., (2016) because both of these were

positively related to the final grade and final grade i.e. course completion had also positive relation to the motivations. The feature quiz attempts was not found in the *Shikkhok* platform which might be a reason for comparatively lower motivation of the learners than the learners of de Barba et al., (2016). As all four elements of motivation were positively related to each other like de Barba et al., (2016), thus, it can be said that the increase of a particular element could affect the other elements of motivation. As the SRL and, specifically, SDL were higher among the completers, therefore, increased motivation of both SDL and SRL could bring the result of increased completion rate.

The perception of the learners to the course were identified through the open-ended questions. They selected three areas such as instruction language in Bengali, course design, and teacher and teaching method which motivated them massively. The learners were highly motivated in getting the Bengali content without spending any cost. Besides, they thought that the course instructors were well-prepared, and it was easy to understand the delivery process by the course instructor. Overall, they mentioned about 13 points which motivated them to participate in the course. The three points discussed above were mentioned by both the completers and non-completers. To conclude, the learners of the *Shikkhok* platform were generally motivated to learn from the Bengali MOOCs. Among the four motivations, SDL could help the learners much to complete the course followed by SRL and all the four elements of motivation positively associated with each other.

Research question 3. What are the existing challenges regarding participation patterns and motivations in Bengali MOOCs which triggers the learners for not completing the course?

Time was the main factor for not completing the course which is aligned with the findings of Rieber (2017). The learners had not enough time to complete the course. As a consequence, after starting the course, the felt that the course time was greater than they expected. Though during the first lecture, the course instructors of *Shikkhok* provided a clear outline of how many lectures would be given for their respective course. It might be assumed that the length of their video lectures was much longer than expected. In the open-ended responses, the participants mentioned that they want shorter videos which can be used in supporting the previous statement. On the other hand, a striking result is that many learners just started the course casually without having any intention to complete the course which was termed as "shopping period" by DeBoer et al. (2014). This result was also supported by the study of Rieber (2017). The same number of the learners mentioned that the course did not meet their expectations. Many of them wanted advanced level content while a number of them asked for examples, homework, home exam, and real-life projects. Missing of these features might be the reason for not meeting their expectations. The learners identified some other reasons but the mentioned-above were the main.

Regarding the experience of learning from the course, a good level of satisfaction was observed among the completers. This satisfaction was comparatively lower to the non-completers. The learners specifically mentioned the course instructors' knowledge and preparation which got the highest mean. According to them, the way of presenting the concept was understandable to them. In contrast, the lower mean was found in the case regarding the openness of the course instructor to the students. These findings illustrate that though the teachers were prepared well, however, the interaction process between teacher and students was missing. The *Shikkhok* platform has not a forum or discussion facilities where students and course instructor could discuss on the studied topic.

The learners were also asked to remark on the areas of improvements which can also be considered as the current challenges for the Bengali MOOCs. According to the learners, they needed more development in content related issues. They also wanted quizzes, assignments, homework and projects related to the real life. Besides, according to them, there was scope for improvement in the area of interaction between students and teacher. These opinions provide the insights that the organization of the *Shikkhok* platform might be redesigned. In the previous research questions, it was found that the learners were generally motivated. Overall, if these challenges are addressed properly, the completion rate might be increased.

To summarize, with some differences, the main findings are alike with the pattern of the findings of Rieber (2017) and de Barba et al. (2016). The differences between the current study and the other mentioned two studies might be found due to the limitations of the *Shikkhok* platform. These differences

might be lower if it was possible to consider the assessment system, quiz attempt and video hits for analysis in this study.

5.2 Limitations

The study has some limitations too. Firstly, this study did not consider the course content including video materials, text and pictures for analysis due to the technical limitations of the *Shikkhok* platform. All the videos of this platform were posted either on YouTube or Vimeo, hence, the videos were open to all. Anyone can access these videos anytime. Because of this feature, the video hits were not counted as it could provide the wrong user data. Besides, the interaction process between the learners and course instructors in the comment section under each lecture was also overlooked. The platform has no specific forum and discussion system and they used the website commenting system for interaction. The inclusion of the interaction analysis might provide a better understanding of the investigated issues. Both the above-mentioned content analysis and forum discussion process were not included in this study because there was no mechanism to track the learning logs of the learners. Without specific log data, such analysis could provide wrong interpretation. On the other hand, the second limitation is related to the sample size. Among the 65 courses offered by the *Shikkhok* platform, only the learners of four courses were considered in the sample frame. As the selected courses deal with the advanced level issues such as statistics and programming, therefore, the participation was comparatively lower than the other courses. It can be assumed that if the learners from some other popular courses were considered in the sample frame, the study findings might be more particular to understand the situation of investigated issues of Bengali MOOCs.

5.3 Practical recommendations and future research

This part provides practical recommendations to improve the overall situation of Bengali MOOCs. The four recommendations are made based on the study findings and discussion. As the key limitations were found in the *Shikkhok* platform, therefore, the main recommendations are made with the aim to improve the platform.

Practical recommendations

The first recommendation is related to the establishment of a learning management system. Earlier, it was discussed that among three platforms, *Shikkhok* has the maximum features in Bengali MOOCs, however, the study findings reveal that there are enough scopes of improvement. For being a well-organized platform, the platform may consider a good learning management system from where it would be possible to record the learners' activities. It is not only important for the platform authority to achieve the credibility but also similarly important to the learners so that they could assess their learning progress. The conjugation of content and quiz or assessment system could also be established. Currently, the platform could be considered like a storehouse of lectures where the instructors were providing their lectures with videos and texts. A learning management system could integrate all the necessary features of MOOCs.

Secondly, this platform does not have a forum or discussion panel. There are lots of free plugin in the online which could be integrated with this content management system. From a forum, students could learn from each other. Besides, they can interact with the teacher too. In the online lectures, it is always not possible to cover all the topics. Hence, a forum or discussion panel could provide extra advantages to the students where they can discuss their quiz, assignments, and other problems.

Thirdly, real-life examples, assignments and projects could be incorporated in the courses to sustain the learning. Many participants complained that the lectures were only theory-based, and they wanted the video lectures with real-life examples. Besides, some participants asked for the short video clip, infographics, homework or home exam, instructional design and pedagogy-based learning and improvement of the interactive teaching. The study findings also showed that learners were motivated either poorly or at a moderate level. Their motivation level might be higher if these features would be improved. The higher motivation level could lead to the higher completion rate. As a positive correlation was found between spending time in the course and completion rate, thus, if the course is designed in a

way that learners get the interest to spend more time by providing a solution from the real-life examples or projects, the rate of the completion might be higher.

Finally, a certificate or award could be given to the learners who completed the course. Getting a certificate after completing a course can be considered as a recognition. Those who completed the course gained knowledge more than the non-completers and the study reported that post knowledge of the learners was higher than the prior knowledge. Besides, if they get a certificate from the platform authority, there might be a good chance to be more motivated to take another course. Moreover, the result shows that the specific reason for learning this course was for the personal and professional development. A certificate of completion could help the learners in their professional workplace which also could motivate them to complete the course. Because of the certificate, the dropout rate might also be reduced.

Future research

The history of Bengali MOOCs is relatively new and there are huge scopes of improvement. In spite of limitations, learners showed their interest in the *Shikkhok* platform as it helped them to overcome the language barrier in online learning. If the platform could overcome the discussed limitations, it might be more popular with the Bengali-speaking people. To reduce or overcome the limitation, a comparative study can be conducted where the technical, pedagogical, and management-related issues of this platform will be compared with the standards popular platforms such as Coursera, edX or Udacity. This comparison could help to understand the strengths and limitations of the current platform.

The data collected from the participants was self-reported. Therefore, the actual situation might be different. An experimental study can be conducted where the overall activities of the experimental group will be observed and recorded, and then the result will be compared with the control group. The variance between these groups might show the significant difference regarding participation patterns, motivations and course completion status.

Finally, the current study did not consider the quality of content and the entire teaching-learning system. The contents of Bengali MOOCs are created by the course instructors themselves; however, this could be a matter of investigation whether the contents meet the standards. The similar suggestion is applicable to the teaching-learning procedure too. This study already found out that there was a gap in the interaction between the course instructor and the students, an in-depth study could explain this in detail and could help the MOOCs platforms how to overcome this problem.

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Appendix

Survey questionnaire

Dear participant, greetings! I am Goutam Roy studying master's in Educational Science and Technology in the University of Twente, Netherlands. As part of my master's thesis, I am conducting a survey to find out the relation between completion status and participation pattern and motivation in Bengali MOOC. You are selected as participants as you registered to *Shikkhok.com* to learn any of the following courses such as Python, R, SAS and Statistics.

Please be informed that only me and my supervisor will use the data you provided, and data will not be shared with anyone else. Your contribution is anonymous, so the data will be treated with great care and confidentiality. The answers will be used to write the master's thesis and scholarly article. It will take approximately 10-12 minutes to fill the form. You can withdraw your response anytime by sending an email to me given in the last page. I would like to thank you in advance for giving your valuable time.

1. Are you giving your consent to take part in the survey?
- Yes
- No

(If no, the survey will be directed to the last 'Thank you' page)

Section 1

Demographics

2. Which of the following best describes you? (Choose all that apply)
- High school student
- College student
- Undergraduate student
- Post-graduate student
- Doctoral student
- Primary or high school teacher
- College teacher
- University teacher
- Education-related professional
- Non-education related professional
- Other higher education professional
- Data analyst
- Website and/or information technology professional
- Corporate manager
- Just a person who is interested in this topic

3. What is your highest level of education? (Select only one)
- Below Secondary Education
- Secondary Education
- Higher Secondary Education
- Bachelor's Degree
- Master's Degree
- M.Phil. or PhD.

4. What is your gender?
- Male
- Female
- Prefer not to say

5. How old are you?
- Below 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65 or older

6. What course did you do registration in *Shikkhok.com*? (Select only one) (If you did registration to more than one, please select that course where you engaged more)
- Python
- R
- SAS
- Statistics

7. Have you taken this course in another online platform before?
- Yes
- No

8. How did you hear about this course *on Shikkhok.com*? (Choose all that apply)
- Through a social media site (like Facebook or Twitter)
- From a news story (print, radio, or TV)
- From a friend or Colleague
- From an ad in the web
- From a web search
- From the instructor

Technical

9. What devices did you use to access this course most of the time? (Choose all that apply)
- Desktop or Laptop (Windows)
- Desktop or Laptop (Apple)
- Android Phone
- iPhone
- Android Tablet
- iPad
- Other (Please specify)

Student Expectations

10. What was your general reason for taking this course? (Choose all that apply)
- Learn about the subject
- Be part of a community of learners
- Complete the course
- Gain skills for a career opportunity
- Other (Please write)

11. What was your specific reason for taking this course? (Choose all that apply)
- Begin to use data analysis in my workplace
- Refresh my understanding of that course
- Personal or professional development
- Other (Please write)

12. How many hours a week, on average, did you spend on this course? (Select only one)
- Less than 1 hour
- Between 1 and 2 hours
- Between 2 and 3 hours
- Between 4 and 5 hours
- Between 5 and 6 hours
- Between 6 and 10 hours
- More than 10 hours a week

Self-Assessment of Prior Knowledge

13. Please rate your prior knowledge in the topic you started to learn during registration on *Shikkhok.com*?
(7-Extremely high; 6-Very high; 5-high; 4-Moderate; 3-Low; 2-Very low; 1-Extremely low)

14. Please rate your knowledge in the topic when you left to learn?
(7-Extremely high; 6-Very high; 5-high; 4-Moderate; 3-Low; 2-Very low; 1-Extremely low)

Motivation

15. Please rate the degree to which you agree with the following statements:
(7-Strongly disagree; 6-Disagree; 5-Somewhat disagree; 4-Neither agree or disagree; 3-Somewhat agree; 2-agree; 1-Strongly agree)

- I wanted to learn as much as possible from this course.
- I've always been fascinated to learn this course.
- I was excited when I started this course.
- I found the content of this course to be personally meaningful.
- When studying for this course, I went through the videos and my notes and tried to find the most important ideas.
- When studying for this course, I pulled together information from different sources, such as videos, websites, and forum/discussion board.
- When studying for this course, I tried to determine which concepts I didn't understand well.
- I had a regular place set aside for studying.
- I made good use of my study time for this course.
- I thought this course was going to be interesting when I started.

Perceptions of Quality in an Online Course

16. Please rate the importance of each of the following course design elements for what you would consider a quality course design:
(7-Extremely important; 6-Very important; 5-Moderately important; 4-Neutral; 3-Slightly important; 2-Low important; 1-Not important at all)

- Course designed by a subject matter expert in the field
- Synchronous, or live, online class sessions where the instructor presents information, answer questions, and participants hold real-time discussions
- Lectures or presentations with audio narration by the instructor or an expert
- Lectures or presentations that are text-based (i.e. no audio narration) with some graphics or photos
- Open-ended projects with personal feedback from an instructor
- Open-ended projects with feedback from other participants
- Computer-graded multiple-choice quizzes or tests
- Personal communication with the instructor (via phone, email, etc.)
- Personal communication with fellow participants (via phone, email, discussion boards)

17. The courses of *Shikkhok.com* are free. However, for the sake of argument, what would have been the maximum fee you would have been willing to pay?
- I would not have enrolled if there was any cost
- 10 – 100 BDT
- 101 – 500 BDT
- 501 – 1000 BDT
- 1001 – 2000 BDT
- 2001 – 5000 BDT
- 5000+ BDT

18. What do you believe should be the top priority for how MOOCs are designed or offered?
- Instructional quality should not be compromised.
- Courses should always remain free of charge.
- Courses should allow high capacity enrolments.

19. Did you complete the course?
- Yes
- No

(If the answer is YES, will be redirected to the Section 2)
(If the answer is NO, will be redirected to the Section 3)

Section 2
(for those who completed the course)

20. Please rate the degree to which you agree with the following statements:
(7-Strongly disagree; 6-Disagree; 5-Somewhat disagree; 4-Neither agree or disagree; 3-Somewhat agree; 2-agree; 1-Strongly agree)

- The course met my expectations.
- The course was effectively organized.
- Assignments and activities were clearly related to course goals.
- Assignments and activities were useful for helping me learn.
- New skills and/or concepts were presented in ways I could understand.
- This course challenged me to think and learn.
- The time I was told to expect to devote to the course was accurate.
- The instructor was knowledgeable and well-prepared.
- The instructor was open to students' questions and comments.

21. Please rate the importance of each of the following to you being able to successfully complete the course:
(1-Extremely important; 2-Very important; 3-Moderately important; 4-Neutral; 5-Slightly important; 6-Low important; 7-Not important at all)

- The course's overall organization and design
- Narrated video presentations of the course content
- Help and support from other participants
- Personal interest in the topic
- External reasons, such as needing to know this information for my job
- The personality of the instructor as represented in the course materials

Motivation

22. Please rate the degree to which you agree with the following statements:
(7-Strongly disagree; 6-Disagree; 5-Somewhat disagree; 4-Neither agree or disagree; 3-Somewhat agree; 2-agree; 1-Strongly agree)

- I enjoyed this course.
- Even when course materials were dull and uninteresting, I managed to keep working until I finish.
- I worked hard to do well in this course, even if I didn't like what I was doing.
- Time went by really fast during the course.
- I had no problem maintaining my interest level during this course.

Open-Ended Comments

23. What was the strong point of this course?

24. What was missing from the course, or how could it be improved?

Section 3
(for those who did not complete the course)

25. Which of the following best characterizes the reason you did not complete the course? (Choose all that apply)

- My goal was never to complete the course.
- I did not have enough time to complete the course.
- The time needed to complete the course was greater than I expected.
- The time I was told I needed to spend on the course was less than I was willing to commit.
- The course did not meet my expectations.
- I only intended to browse or casually check out the course.
- I did not like the design of the course.
- The course was too demanding.
- The course was not demanding enough.

26. Please rate the degree to which you agree with the following statements:
(7-Strongly disagree; 6-Disagree; 5-Somewhat disagree; 4-Neither agree or disagree; 3-Somewhat agree; 2-agree; 1-Strongly agree)

- The course met my expectations.
- The course was effectively organized.
- Assignments and activities were clearly related to course goals.
- The instructor was knowledgeable and well-prepared.
- Assignments and activities were useful for helping me learn.
- New skills and/or concepts were presented in ways I could understand.
- The instructor was open to students' questions and comments.
- This course challenged me to think and learn.
- The time I was told to expect to devote to the course was accurate.
- The course's overall organization and design are good.
- Quality of narrated video presentations of the course content is good enough.
- The personality of the instructor as represented in the course materials is excellent.

Open-Ended Comments

27. What was the strong point of this course?

28. What was missing from the course, or how could it be improved?

Thank you very much for your kind effort to complete the survey. Please feel free to contact me if you have any query regarding this survey at g.roy@student.utwente.nl