Investigating the Common Factor of Drop Out based on Learner's Perspective and Dropout Rate in MOOCs in Malaysia

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Abstract - *Massive open online Course (MOOC) is an emerging online learning platform that is known to recruit a wide amount of users. MOOC seizes challenges for designers as well researchers and provides learning contingency to users. However, the dropouts among users remain to be a significant issue and there is still a need for further investigation especially in users demographic context. In the past, studies exist that analyze the dropout factors; however, no major contribution work available that focuses on demographic findings. This study analyzes the common dropout factors based on learners perspective in Malaysia. As demographic context can also contribute to dropout factors. According to our study only 18% Malaysian users complete the courses they opted and around 64% people have never joined any MOOC platform which shows lack of awareness and dependency on traditional classroom education. In this study, factors such as communica- tion language, time to study, financial support and other factors have been examined. Moreover, we have also compared the dropout factors with other countries to find out the common dropout factors and demographic pattern. Further, based on our study, improvement suggestions are also presented.*

1. INTRODUCTION

In this digital world, people opt for a platform that can be accessed anywhere and anytime and provide lifelong learning for wider audience. Due to new revolution of technology and internet learning over internet become desirable approach in education, higher institutions. The first Massive open online Course (MOOC) is initiated in 2006 and developed for open learning mode of public in 2012. In an experiment on e-learning platform in 2008, approx 2200 students has participated without paying anything for extended education. In last two decades MOOC has widen its wing in both domestic and international higher education (Yeon & Jeongmin, 2018). MOOC is online courses available for large number of learners with or without any charge, with or without any certification. MOOC's are classified in two categories - 1. cMOOC, where c stands for connectivist. Blogs, social media platforms and media communities are common source of interaction. 2. xMOOC, where x stands for extended MOOC, which resembles traditional courses. Coursera, Udacity, Edx, FutureLearn etc are examples of xMOOC. MOOC is one of the greatest education material content for everyone who is eager to learn. According to Fisnik, Ali & Zenun (2018) MOOC is a place to gain additional skills for students to fill the gap between theories learnt in Universities versus industry demands. Now-a-days participants can also learn languages like Mandarin on MOOC platforms. Quality as-surance will be needed for long term basis, but many MOOCs do not pay much attention to maintain and improve the structure.

These days many universities are emerging their own online platform and providing substitute for professionals to gain additional knowledge, training and education. Many universities are unfolding themself and taking part of coursera and other online learning communities. Many universities are providing these courses free of cost to their institute students and minimal cost for students around the world. A few universities are also providing distance education to the working professionals. We wanted to understand participants experience, barriers, interaction with online courses. What is the perception behind taking the courses online. What is being taught in university is not well comprehensive due to limited time and expertise. However, sadly that there is a large portion of the audience do not complete their studies in MOOC due to several reasons (Chen, 2012). Which may show a lack of perseverance and self-motivation.

Exploring a survey data of University of Malaya students and professionals in Kuala Lumpur, Malaysia. We aim to explore the retention rate and causes of retention among Malaysian learners. We first perform the analysis for student learners survey data and find out the reasons of dropouts then with literature review of previous researchers we compared and found common dropout factors among other countries. High dropout issues are still with MOOCs, as people register for courses but do not continue to complete the course. In developing countries dropout rate is much higher than in developed countries. We want to find out the factors behind the dropouts specifically among students in Malaysia. Recent research emphasized more towards investigating learners motivation in MOOCs, however, there is a need to discover the common factors that cause dropouts among learners in MOOCs including the recent percentage of dropouts. Therefore the aim of this study is to investigate the common factors of dropouts and retention rate in MOOC specifically

among learners in Malaysia. Our study is quantitative and qualitative which includes the cause of retention, rate of retention and other parameters. In this study, we also discussed major retention causes among developing and developed countries.

Objective – For this study, we are interested in finding out the following,

- Common dropout factors.
- Dropout rate among Malaysian learners.
- Procedure for identifying the common dropout factors.
- Role of demographics in dropout.

Organization – The rest of the paper is organized as follows. Section II covers the recent research contributions in the area. In Section III propose research methodology is is presented. The dropout factors are analyzed in Section IV. Finally the discussion and conclusion is covered in Section V and VI.

2. LITERATURE REVIEW

This section briefly covers the MOOC background, user engagement and existing work. We will specifically review MOOC course culmination and drop out reasons in countries among the world starting from 2013 to 2019.

MOOC Background – MOOC first launched in the University of Manitoba in 2008 and continuously expanded to 94,000 MOOCs offered by more than 800 higher institutions with 81 enrollments all over the world (Chong, Qiub, & Chenga, 2019). It offers widely accessible online contents including videos, quizzes, reading materials together with social communication tools that enable students to study at their own pace (Ayse et al., 2018). In addition, MOOCs delivery mode, ability to cross geographical locations, time and limitation in the human resources are bound to take education into a higher level (Vardi, 2012). Massive Open Online Course (MOOC) is a way to promote digital learning. It opens opportunities for higher education and also enhances the quality of learning (Yeon & Jeongmin, 2018). It is online learning that lets students enjoy multiple subjects online with minimum cost burden (Veletsianos, Collier, & Schneider, 2015). People from different backgrounds and levels can enjoy rich materials in MOOC with established professors and lecturers in 2014.

Learning Engagement in MOOCs – Increasing numbers of students enroll in MOOC gives engagement refers to the time and effort participants spend to learn in MOOCs. Students learn better when they make face to face with learning materials and significant connections with peers and tutors. Students in MOOC are attracted in two-ways interactions with their peers, responsive feedback, challenging and supportive learning environments are the reasons that keep students in MOOC. Engagement is important to motivate students to complete the tasks, instead of just sign up for learning experiences (Wang & Baker, 2015). The most common engagement of MOOC learners is watching lectures. To measure the engagement of participants is if the learner has submitted any assessment or watched any video during the cognitive engagement week. We can further divide the engagement of learners into two sections - based on assignment or quiz submission, Based on lectures watching. As many participants take part to watch video lectures but want to jump over to the assignment part.

Learners' Engagement in Courses – World globally and developing world from 1996 until 2014. A study Ayse et al (2018) on course completions is analysis from social engagement and peer interactions to further deepen the correlations between engagement and course completion.

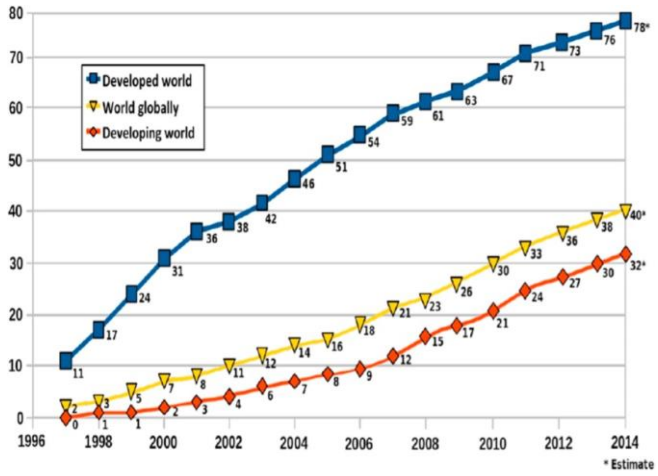

Fig. 1. shows internet usage in developed world

Below is the data collection and analysis:

- Behaviours in videos: It is measured based on how long the length of watching, pauses, replay etc.
- Behaviours in discussion forums and other social media tools if available: This study analyses how active par- ticipants in the forum page visits, exchanging ideas to discussions etc.
- Behaviours in assignment submissions: It is been mea- sured by timely submission or not to analyze commit- ments of students.
- Behaviours in the course structure: progress, as measured by the sequence of links, clicked on during the interactions with the course.

Apart from that, correlation can be made between the participant's social behaviors and course completion rate in MOOC. They can be categorized as:

- Inactive: Socially inactive
- Rare: Learners who initiated less than half of activities
- Active: Learners who keep initiating the actions(post comments in forums, like, respond to questions)

Social Behaviours of participants can be observed on the frequency of participants posting and reverting to queries, following someone and liking a comment. Further dig analysis is on how interactions have been made to the same persons in the comments by Ayse et, 2018.

MOOC dropout Study - By Coffrin and Corrin a study begins in 2014 at the University of Melbourne on Principles of Macroeconomics and Discrete optimization courses. In inaugural the course captivates 54,217 students and among them, 32,598 had registered for the course and after 8 weeks of course duration unfortunately, only 1412 attendees (4.33%) completed the courses.

In the same phase, another study conferred by K. Jordan in 2014 analyzed 91 courses from universities around the world, most courses are from Coursera and a few are from Edx, MITx and Udacity. In total 226,652 students enrolled for courses and 4500 approx 5.03% attendant and average 6.03% has completed the courses.

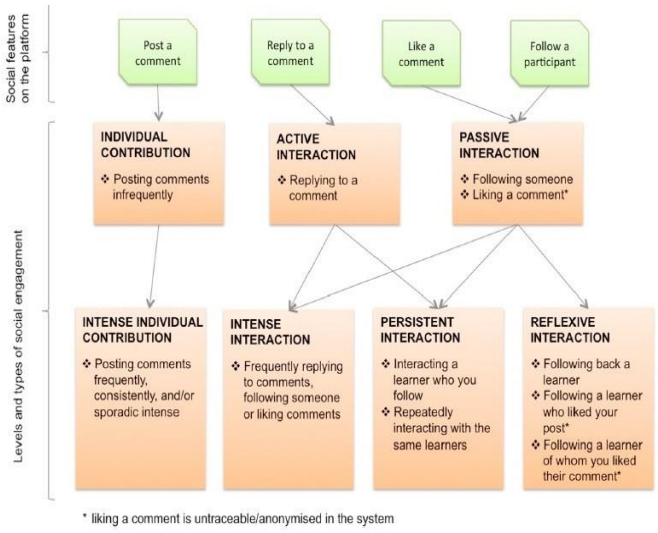

Fig. 2. Shows categories of social actions of active participants

By GOMEZ-ZERMENO and LA GARZA in 2016 Analyses result of the pre-diagnostic survey and initial survey after the first week of the course granted by a Mexican private university on Educational Innovation with Open Resources with 20,400 enrollment, 70% participants didn't respond it. After course completion author analyses each week's assessment result and survey assessment responses result and concluded that only 11.7% of students have completed the courses which is almost similar to the study done by Lushnikova in 2013, which shows 10% course completion rate of attendees. The author suggested the course content up-gradation might help to improve the course completion rate and lead to better results.

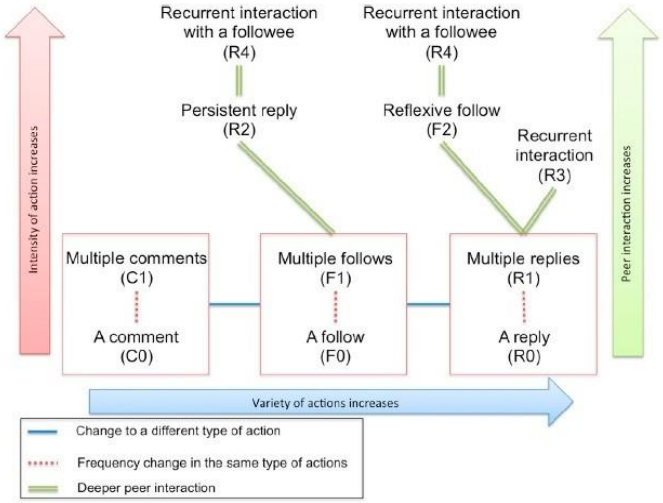

Fig. 3. shows participants of social actions

Dropout Factors – In this section, we reviewed some of the related work done by other researchers relating to MOOCs dropout. The literature's reviewed consisted of two sections where section 1 is the related work done among Malaysia and section 2 is the related works done among other countries.

Malaysia – Kumar & Al-Samarraie (2018) investigates the opportunities, challenges and solutions of using MOOC in the Malaysian higher education institutions based on instruc-tor perspectives. Interviews are done among instructors based on what their opinion about themselves as an instructor in MOOC including their opinion about student users using MOOC. This paper reveals some significant challenges and difficulties faced by instructors and students such as lack of facilities and exposure, concept redundancy, leadership and capacity building and course design and development. It is important to not just improve

learner's experience but also the instructors as they also play an important role in making the course creativity for learners to engage with.

In 2019, Amantha Kumar and Al-Samarraie further investigate new pre-university student's views, challenges faced and their purpose towards MOOCs using interview data. Their findings have shown language proficiency and awareness regarding the purpose and benefits of MOOC are the challenges faced by the students which made English as their second language (non-native speaker). Students also mentioned that they concern about the learning content in the MOOCs where they "articulated the current interaction as boring with synchronous execution" (Amantha Kumar & Al-Samarraie, 2019).

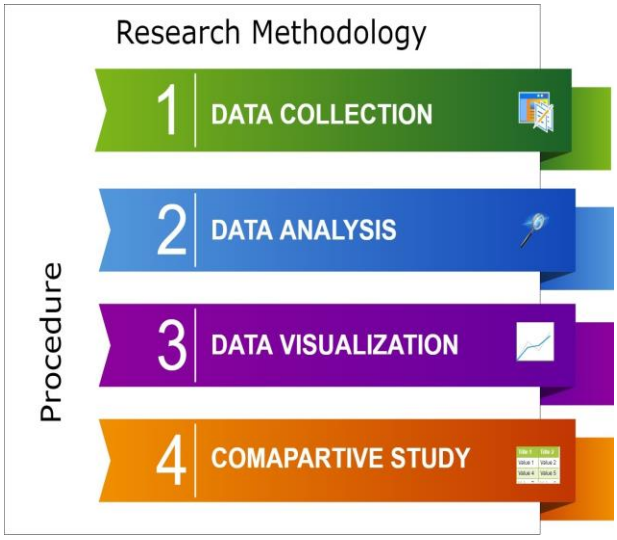

Fig. 4. Steps performed during this study, data is gathered at different location through question-air and past studies.

Other Countries – Onah, Sinclair, & Boyatt (2014) paper determines MOOC drop out from several different perspectives which include reviewing other kinds of literature and data gathering from a Computing MOOC from the University of Warwick, UK. Their analysis runs two parallel modes which are "traditional" MOOC mode (with peer support) and "supported" mode (with real-time, tutored programming labs). The reasons for dropout they discover based on literature reviewing are no real intention to complete, lack of time, course difficulty and lack of support, lack of digital skills or learning skills, bad experiences, expectations, starting late, peer review. Their experimental results support the factors that influencing dropout is due to lack of support. However, they also found out that even though there are students left behind in the course, they still stay with the course at their own pace.

Hone & El Said (2016) explore the factors affecting MOOC retention. Their analysis gathered among students from the University of Cairo, Egypt who voluntarily par- ticipate in MOOC courses that took place six weeks. Their findings revealed that MOOC content, Perceived Effective- ness and Instructor Interactions has a significant effect on learner retention. They also found out that dropout was either happen at or before the midpoint of the course and most of those who past the midpoint went on completion.

Shapiro et al., (2017) understanding MOOCs student experience based on examination of attitudes, motivation and barriers. Data gathered among countries of America, Africa and Asia for two courses in MOOC.

Their findings implicate that different demographics such as different levels of education, gender and countries have different perspectives towards MOOC. Previous bad classroom experiences with the subject matter, inadequate background, lack of resources such as money, infrastructure and internet access had found to be the barriers and challenges mentioned by the interviewed learners and lack of time is the major coded barrier for the students.

Feng, Tang, and Liu (2019) employ a dataset from Xue- tangX which is one of the largest MOOCs in China and the dropout problem in MOOCs was analyzed using systematic study. Positive results on user dropout due to influence from friend's dropout and high correlation between dropouts of different courses. This paperwork also proposes a Context- aware Feature Interaction Network (CFIN) to model and to predict users' dropout behavior.

3. RESEARCH METHODOLOGY

We have divided our study into four steps, starting from data collection, analysis, visualization, and comparative study. Each of these steps is explained below.

Data Collection – Data collection is a procedure to gather the information on the target variable in an organized fashion. We have collected data using google form survey and spread over the University of Malaya, Malaysia and with acquain- tance in Kuala Lumpur, Malaysia. The data collection in-cludes demographic data, Reason for joining MOOC, MOOC dropout reason, Most commonly used MOOC, feedback to reduce dropout. The data is collected for all age groups from undergraduates to Ph.D. students and working professionals.

Data Analysis – In data analysis, we look over the raw data using statistical, logical and analytical tools to illustrate and evaluate the data. data analysis is a process of cleaning, measuring and exploring data with the intent to get useful information. Before analyzing the data there are some aspects we need to follow - data collection method, data context, data appropriacy, data redundancy, data visualization method. For data analysis, we have used Microsoft excel.

Data Visualization – Data Visualization is a form to represent quantitative data into pictorial or graphical form to understand the data easily. The main goal of visualization is to understand data critically and express it in a way that shows the relationship to other data. In this paper, we have used Qlik software (Qlik is a data visualization software which joins or merge any data sources, no matter how large or complex, into a single view) to visualize our data. Data Visualization has been done by combining various data types.

Comparative Study – These days participants from all over the world are using MOOCs to learn, train themself and update their skills. Participants are registering for online learning platforms as it is easy to access anywhere, anytime rather than traditional classes. But many participants do not complete the courses, dropout is common among all the countries. With literature review of more than 10 papers, a comparative study of MOOC's dropout and the reason behind dropouts into different countries have been done.

4. DATA ANALYSIS

In this section, the identified critical parameters are explained and discussed in detail.

Age ratio – In this study, our respondents were aged between 16-40 years. In our study, our target audience was mostly university students (Undergraduate, graduate, Ph.D. & Staff) Based on participants age we categorized them into 4 groups. Among all groups maximum respondents were from the second group aged between 20-25 years and the end result of MOOC used by the particular aged group is also group 2. Figure 5 below shows the age ratio of the communicator.

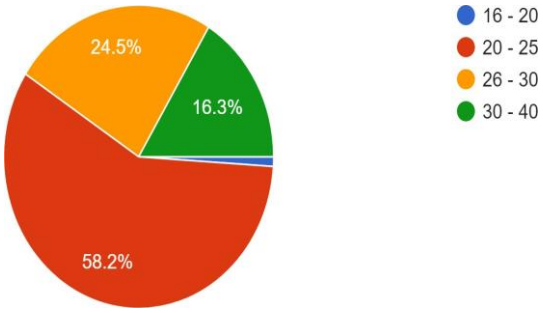

Fig. 5. Age ratio of responders

Demographics – A basic demographics description of the answerer, Based on gender it went up to 39% who have never used any MOOC platform were Female and went down for who have used MOOC platform to get additional knowledge or other reasons went down to 18% for Male. As we have more females in our study so the result may vary, But we are continuing our research to get more accurate data.

Motivation for MOOC – Motivation is the reason for people's goals and willingness to perceive the goal. Re- searchers have found that online engagement has increased because of online learning platforms. Here the motivation is to understand learning in online environment, As online learning saves time, money and fewer efforts one has to put for learning it online and you can study whenever time

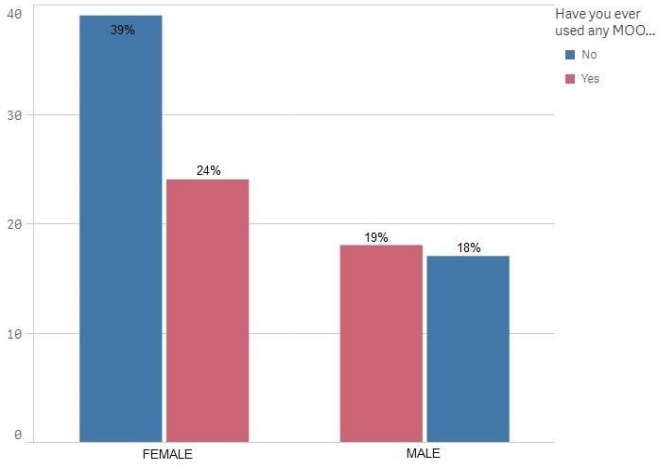

Fig. 6. Demographics of respondee with MOOC used

suits users, Just need a good internet connection. According to the feedback from our participants mostly learners uses MOOC

to gain additional knowledge, Personal growth and for their personal interest. A few participants only join online learning platforms as they have suggested by someone or compulsion for university courses. The MOOC's are open to all age group so people are tend to be more interested to learn.

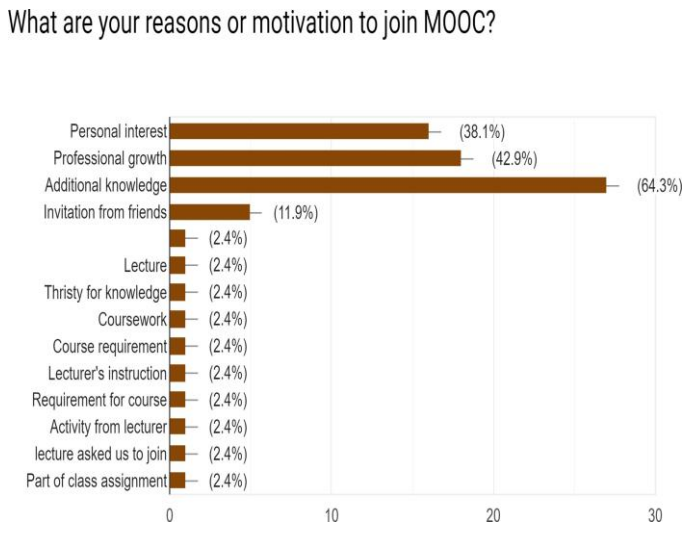

Fig. 7. Motivation feedback to join MOOC

Reasons of dropout – As we know there can be a motivation behind joining the MOOCs but course completion depends on their willingness to learn. Although in 100 users there are only a few users who successfully finish the courses and remaining drop the courses, here are the reasons for dropout from our study -

1) One of the most common reason is time constraint, As Users are engaged with their professional life and having a lack of time to commit for the course so they tend to dropoutof the course.
2) Culture and language plays a vital role in learning, If the user's native language is not English and MOOC don't have Multilingual option so people have difficulty to understand and grasp knowledge from MOOC and they tend to dropout.
3) Some users only join as they got an invitation to join or suggested by someone, But they feel bored with online learning.
4) Usually user has to pay for certifications, there are many student users so rather than paying they simply dropout from the course.
5) Some users find difficulty and as MOOC doesn't have live query resolve option they need to wait to get the solution into the forum and loose interest to continue, so they opt to dropout.
6) Participants have mentioned that they didn't find proper guidance and course quality was also reprobate.

There can be many more reasons for dropout, These are the main reason found from our study.

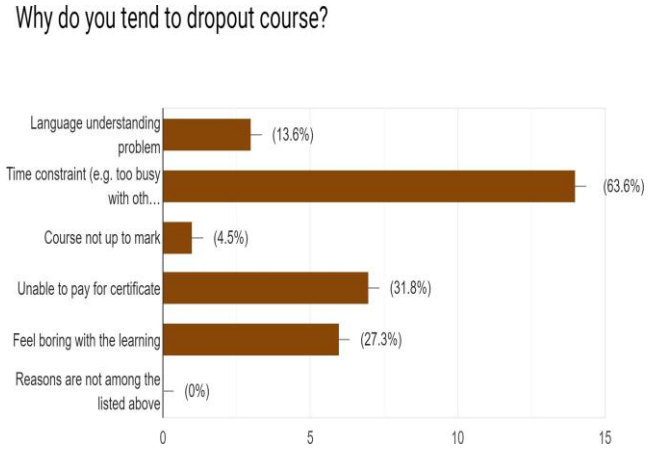

Fig. 8. Reasons of dropout online courses

Common dropout factors – From our study and based on analysis of other researchers previous work from different countries such as China, United Kingdom, USA, Sweden, Egypt, Australia, Africa and Malaysia. The causes are almost similar to everywhere for drop out. Language barrier is one of the significant factors that need to be highlighted as not all MOOC users are among the native English speaker. Technology, network limitations, lack of awareness, difficulty in relating concepts with implementation and course level also become the main factors for participants. In developed countries, time constraints and lack of interest to complete the course are the supportive reasons to dropout.

5. DISCUSSION

From our study among all countries including Malaysia, a few dropout factors are identical for all non-native English speaking countries. For native English speakers, time constraints and invitation from friends were the most common dropout factors. Language, Time constraint, limited live support, certification fee are major barriers for non-native En-glish speaking countries. From reviewing other researcher's work in the world and our study, after a decade of MOOC invention also MOOC retention rate is much higher and the completion rate is below 20%. By identifying and comparing the dropout factors of MOOC users of all countries can benefit to MOOC community and course creator to improvise and get a high completion rate.

6. CONCLUSION

Even though there are some MOOC successfully results in high completion rate, however, there is a need to discover the dropout rates and factors according to demographics. As not all users have similar ways of learning and characteristics. Our study among students and professionals also shows that most participants are between 20-25 years, which concludes MOOC and other digital learning platforms attract more to this age group personage.

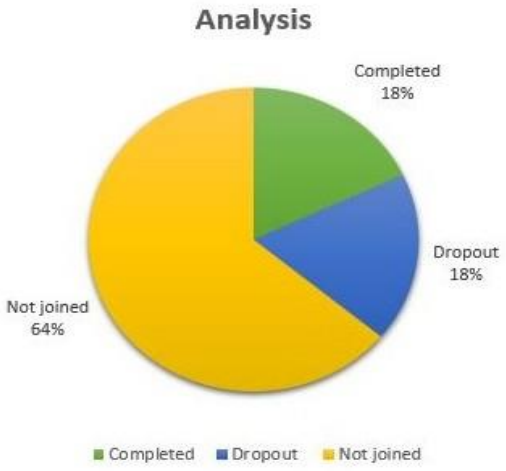

Fig. 9. Rates of completed, not joined and dropout

TABLE I

COMPARATIVE TABLE FOR DROPOUT REASON

Author	Quantitative	Qualitative	Type of partic- ipants	Country	Dropout Rates	Dropout Factors	Result Outcome
Onah, Sinclair, & Boyatt, (2014)	✓	✓	Not specific	United Kingdom (Computing For Teachers (CfT) MOOC)	✓	✓	**Dropout factors** 1. No real intention to complete 2. Lack of time 3. Course difficulty and lack of support 4. Lack of digital skills or learning skills 5. Bad experiences 6. Expectations 7. Starting Late 8. Peer review 9. Lack of support
Hone & El Said (2016)	×	✓	Under graduate & Graduate	Egypt	×	×	**Influences of retention** 1. Course content 2. Perceived effectiveness 3. Instructor interaction
Yang, Sinha, Adamson, & Ros (2013)	✓	✓	Not stated	Not stated (Coursera)	×	✓	**Dropout factors (Social)** 1. Centrality 2. Average Clustering coefficient 3. Eccentricity 4. Au- thority and Hub scores
Kumar & Al-Samarraie, (2018)	✓	×	Instructor	Malaysia	×	✓	**Challenges using MOOC** 1. Concept redundancy 2. Lack of facilities and exposure 3. Course design and development 4. Leadership and capacity building
Shapiro et al. (2017)	×	✓	Not stated	America, Africa, Asia (Coursera)	✓	✓	**Dropout factors** 1. Lack of time (most) 2. Previous bad classroom experiences with the subject matter 3. Inadequate background 4. Lack of resources (money, infrastructure and internet access)
Amantha Kumar & Al-Samarraie, (2019)	×	✓	Diploma	Malaysia (Openlearning)	×	✓	**Dropout factors** 1. Language proficiency 2. Aware- ness of the benefit and purpose of MOOCs

Feng, Tang, & Liu (2019)	✓	×	Anyone	China	×	✓	**Dropout factors** 1. High correlation between dropout of different courses 2. Influence between friends dropout behavior
Eriksson, Adawi, & Sthr (2017)	×	✓	Not stated	Sweden	×	✓	**Dropout factors** 1. High workload 2. Challenging course content 3. Lack of time and pressure 4. Lack of awareness fea- tures 5. Social influence 6. Long course start-up 7. Learning on de- mand
Gomez-Zermeno & Aleman De La Garza (2016)	✓	×	High school Technical Career Undergraduat e Postgraduate	Mexico (Cours-era)	✓	✓	**Dropout factors** 1. Problems with the courses struc- ture 2. Limitations in the use of information and communica- tion technologies or limited En- glish proficiency 3. Family reasons or low time disposition

From the data that we collected among learners in Malaysia and compared with prior work of developed countries and developing countries that also study dropout (refer to Fig 7) it can be seen there are similarities and differences of dropout factors. Lack of time had shown the most common reasons for people dropout the course. It can be suggested there is a need for external motivation such as family and institution support and more exposures to the importance and benefits of participating in MOOCs. In developed country, or to be precise developed region in a country, excellent accessibility to internet also a factor for them to keep using MOOC. Users from low levels of education might need a more complex learning method to compare to the higher level of education.

According to user's feedback, we still need improvement in MOOCS.

1) MOOCs should be more interactive, should have op-tion like live chat to resolve query at same time.
2) Moocs should provide language change option so will be easier for non native english speaker.
3) MOOCs should add some gamification to attract users and rewards to complete each course or assignment.

It can be suggested that course structure and design including instructors play important roles in keeping users motivated and engaged with the courses. Therefore, it is significant to identify vary methods and design not just on one particular demographic but vary to improve MOOCs to enable effective learning that is suitable for all types of users.

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