MSc in Business Administration

WHAT ARE THE KEY SUCCESS FACTORS OF MOOC PLATFORMS?

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Abstract

This thesis analyzes key characteristics of Massive Open Online Courses (MOOCs) platforms in order to assess what makes such platforms successful. Three challenges of MOOC platforms were determined from the review of the literature: dropout rates, sustainability and plagiarism. Primary data was gathered from a sample of MOOC platforms, both on the characteristics of the platforms themselves and their internet traffic data. We performed a statistical correlation analysis using *Traffic Rank* as indicator of platform success, and key characteristics of the platforms.

Statistically significant correlations with platform success were found with: platform focus on college education, offering certification, charging fees for courses, enabling online testing, among others. The key characteristics of success identified through our analysis should help platforms overcome the three challenges.

Other statistically significant correlations found, such as the importance of the number of partnerships with universities also helped to identify a key strategy that platforms might follow, flipped classrooms, where content from the MOOCs is used by the universities in the physical courses.

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Introduction

Research Topic

Massive Open Online Courses (MOOCs) are a recent phenomenon that is changing online education as well as traditional education. It has attracted the press and the public interest, some view MOOCs as a positive change, while others view them with criticism (Grainger 2013).

MOOCs have the vision to change the world by giving free and accessible education to anyone, from young people in the third world to stay at home mothers (Bombardieri 2013).

In 2011 MOOCs gained public attention when a Stanford University artificially intelligence class taught by Sebastian Thrun attracted 160.000 students. Later Sebastian Thrun left his teaching position to create, which is today one of the major MOOC platforms, Udacity (DeSantis 2012).

The New York Times has declared 2012 as the year of the MOOCs (Pappano 2012), as major players backed by serious founding started to appear. World renowned universities such as Harvard University and the Massachusetts Institute of Technology launched their own MOOCs or partnered with existing platforms.

MOOCs have introduced the possibility for teachers to teach thousands of students at the same time and not only be restricted by their classroom size.

In 2013 MOOCs have attracted thousands of students, two of the top platforms, Coursera and edX have attracted together more than six million students from all over the globe (Fowler 2013).

Research Proposition

"What are the key success factors of MOOC platforms?"

Due to the recent topic that is MOOCs and with platforms appearing every year with different strategies and approaches, it is important to understand what key characteristics successful platforms have and what distinguishes them from the not successful platforms.

Literature review

Before acknowledging the research it is important to understand what MOOCs, Massive Open Online Courses are, and how it may affect worldwide education and educational institutions. Accordingly with Jim Farmer's (2013) article "MOOCs and Online Education; a real difference", MOOCs – Massive Open Online Courses can be interpreted at massive, meaning hundreds of thousands of students, open meaning free for the student and online, meaning that the courses are delivered over the internet.

MOOCs offer some benefits to its students such as very low cost, effective learning and enhanced institutional reputation (Farmer 2013).

Rather than being an hour long lecture, MOOCs are offered in modules focused in various topics (Voss 2013).

According to Laura Pappano's (2012) article "The Year of MOOCs, in paragraph 15, Ray Schroeder, director of the Center for Online Learning, Research and Service, at the University of Illinois, three key characteristics are important for an online educational platform to attract students:

Quality of material covered, students will choose the platform that offers the best quality on the material they want to study, and this is not a problem for MOOC platforms to offer, since a lot of them are partnering with top universities, in order to have courses that are taught there, in their website.

Engagement of the teacher, this is harder for MOOC platforms to over due to its true nature of being massive, it would be very hard or nearly impossible for the teacher to help and tutor every single student.

Interaction among students, most of MOOCs platforms are offering a way for students to interact with each other, and to answer each other's questions, in a way they are trying to fight the problem mentioned in the previous point.

1. What are MOOCs?

It is important to take into consideration how MOOCs are different from the standard online education. According to George Siemens from Athabasca University (2013) in order to a platform to qualify as a MOOC it must stand by its name:

- Massive, although it might exist different definitions of “massive”, a MOOC is required to have a large number of participants, early MOOCs had around 2.000 participants while current MOOCs offered by the largest platforms such as Udacity might exceed 100.000 participants. This requirements allows for interactions between students, such as in a social network, and in some platforms it even goes to the extension of students organizing “meet-ups” due to their geographic proximity.
- Open, courses should be free for students even if the platform offering them is a for profit organization. Thus content from platforms might not be openly licensed for free use in other teaching situations.
- Online, content and interactions must be mainly online, although some exceptions exist such as local meet-ups. Because of their massive characteristic there is no way for teachers to respond to each student independently, thus material is presented in a more interactive way, with short videos and quizzes along the way making feedback electronic.
- Courses, obviously, the central focus of these platforms is to offer courses in a variety of topics. The course content must be structured and sequenced.

A brief description of the top platforms can be found on Exhibit 1.

2. Who is using MOOCs?

The first idea for the creation of MOOC platforms is that these platforms would help reach a massive amount of the world population that does not have the possibility of acquiring a good education (Bombardieri 2013), but platforms are not really targeting or being used by this segment.

In a study that surveyed nearly 35.000 students from 200 countries who participated in 32 massive open online courses in Coursera published by the University of Pennsylvania in November of 2013 (Christensen et al. 2013), researchers found the most of the people using MOOC platforms are already highly educated young people from developed countries looking to learn new skills in order to advance in their careers.

It was found that 83% of the respondents from all the geographic regions have a post-secondary degree, 79% have a Bachelor's degree or higher and 44% report education further than a Bachelor's degree. The educational level of MOOC students across the world surpasses the national education average of their countries and this difference is particularly accentuated in Brazil, Russia, India, China, and South Africa (BRICS) countries where 79% of the MOOC students in the research have a post-secondary education while only 5% of the population of their correspondent country have a post-secondary education. Demographically over 40% of the MOOC students are under 30 years old, and 57% are males. In matters of employment, 62% of the respondents report being employed full-time or self-employed, while only 13% of the respondents report being unemployed or retired. This demographics are affect by the fact of only having into consideration MOOC students from BRIC countries when compared to OECD countries. In BRICS countries 63% of the MOOC students are under 30 years old and 68% are male.

An analysis published in *The Wall Street Journal* (Fowler 2013) states that 80% of the MOOC students from BRICS countries belong to the 6% wealthiest part of the population, due to the fact that usually they are often early adopters of new technologies.

Students motivation to attend MOOC courses

The study from University of Pennsylvania (Christensen et al. 2013) mentioned before, it was not only focused on the current attendees of MOOCs, and their demographics, but it was also focused on their motivations to attend a MOOC course as well.

Two main reasons for students to enroll in courses were found: advancing in their current job as 44% of the respondents affirmed, and curiosity as 50% of the respondents affirmed.

For students that their main reason was advancing in their current job their focus was on social science, science, health science and math. Students that took courses out of curiosity tend to take humanities courses.

3. How will MOOCs change education?

Using the *disruptive innovation theory* by Joseph L. Bower and Clayton M. Christensen (Yuan and Powell 2013) that states that disruptive innovations go against market expectations, mainly because leading companies tend to look to their consumers' needs in order make management decisions such as develop a new product, or new technology, thus the companies investments will be align with their customers' needs and will not explore new market opportunities.

Being that new innovations that will change how a specific market works, by lowering prices, targeting a different set of consumers or fulfilling different needs of existing customers are "disruptive innovations" and innovations that improve an existing system are called "sustained innovations".

Li Yuan and Stephen Powell (2013) on their paper "Open Education: Implications for Higher Education" used these theory in order to assess how MOOCs will affect higher education, being MOOCs the "disruptive technology" and higher education being the "leading company" competing in the education market.

Due to its early nature, MOOCs are still in their growing phase with a lot of unanswered questions, it cannot be stated that MOOCs will replace entirely higher education institutions, due to the complexity of the current education system.

There is a main difference between students in MOOCs and in higher education institutions, while higher education institutions still target young students looking for a degree, MOOCs are targeting professionals that plan to extend their knowledge or people that are not able to attend or afford university, thus there is not yet a complete overlap of the two markets, meaning that MOOCs cannot yet completely replace a higher education institutions.

When the time comes that MOOCs are able to offer complete degrees recognized by companies, the markets might overlap and it will have an impact on the enrollment of traditional higher education institutions.

As stated by Clay Shirk in The Guardian (2012) MOOCs are the MP3 of the higher education. Being that MP3 is the standard digital audio file used nowadays, it has revolutionized the way music is listened and stored. Its launch came with Napster, which allowed internet users to download music in the MP3 format to their computer. Although

Napster was shut down by the music industry, it showed the consumers that there was a different way to deliver music than just going down to the record store and buying a CD. MOOCs are now showing that there is a different way for people to get educated.

Effect of MOOCs in higher education

With the introduction of MOOCs higher education institutions are faced with the challenge of adapting to a new disruptive innovation that has come to their market, something that in the market of higher education is not very common as higher education has not changed much throughout the years.

As mentioned by Joseph E. Aoun (2012) in his article "A shakeup of higher education", MOOCs are forcing the higher education market to shift from a vertical integration to a horizontal integration. For a long time higher education institutions were responsible for knowledge creation, teaching, testing and credentialing, thus controlling the market vertically.

MOOCs have started to shift the higher education market to a more horizontal approach by decoupling teaching and learning from the university campus, as MOOCs evolve this shift will be even more noticeable. Some MOOC platforms are already working on testing and certifying students, as a lot of platforms already offer a certification of completion, stating that a student has finished the course, although it still does not have any university recognition, it is already a start of something that might grow a lot larger.

First, prestigious low acceptance rates of top higher education institutions will mean nothing if students take MOOC classes, since platforms are open to anyone. Also, when and in the case that MOOCs are able to graduate students, higher education institutions will change its focus on the input measures that they use to distinguish themselves, such as average grade of their intake students and will start focusing on output measures, such as average graduation rate.

As further as MOOC platform evolve, it will get to the point where traditional higher education institutions will need to reevaluate their value propositions, as students might question why there is a need to pay for education on-campus, if they can get the same education for a low price or for free. Institution that will be able to demonstrate their value added will be stronger, and institution that fail to do it, will fail as well.

One of the downsides that might be created by higher education institutions that offer MOOC classes as well, might be the creation of a two-tier degree system, where students that are taking on-campus classes might be given superior credentials than students that take online classes.

Ultimately MOOC platforms need to advance very far to be able to disrupt the monopoly that is higher education these days.

4. Why MOOCs?

Due to the recent nature of MOOCs, it is not surprising that some benefits and issues can be found. On the info graphic (Exhibit 2) developed by Online Colleges (2013), some benefits and issues for the students of MOOCs were found.

As for benefits:

- MOOC courses are usually free unless some type of certificate is involved
- Learning is informal and students take courses at their own pace
- All courses are easily accessible on an on-line platform
- Participants are not required to be enrolled in the host institution to attend courses
- Work can be shared and discussed by all participants through a discussion forum.
- Famous and outstanding professors can reach more students than they could ever reach in their classrooms

As for its issues:

- Some MOOC providers start to charge some of its classes, in the search for monetization
- Due to the nature of on-line classes students are not able to socialize in the real world
- Technical problems with the student's computer or internet connection might get on the way of learning
- Traditional ways of teaching might be preferred by the students
- Students need to become responsible for their own learning

Platform's Challenges

In 2013 George Siemens has stated that although most of the coverage is focused on the positive aspects of MOOCs, some challenges are starting to become evident such as the high dropout rates, sustainability and plagiarism.

Dropout rates

Dropout rates are reported to be between 91% and 93% (Yang et al. n.d.), but reasons that lead students to dropout from MOOCs are different from reasons that lead students to dropout from traditional courses. The main difference can be found in the level of commitment from students, with traditional courses students have more engagement as they are seeking credit, have already paid tuition and might need to take a course in order to continue their studies, according to George Siemens (2013) this type of commitment is considered "hard commitment".

Students that take MOOCs will not have this type of "hard commitment" since MOOCs are free and open, dropout reasons are completely different, from a range of a student that just signed in for the course and a student that is only interested in a few topics of that specific course.

Despite of the high dropout rate mostly announced, there are some key considerations that should be taken, recent data collected by Jeffrey Pomerantz (2013) form the University of North Carolina that taught a MOOC, "Metadata: Organizing and Discovering Information" has found that it is important to have into consideration the different type of engagement from students.

Nowadays, the percentage of dropout rates is calculated by dividing the number of students that earn a certificate by the number of students that enrolled in a determined course, either for regular college as well as for MOOCs.

On an analysis done by Jonathan Haber (2013) from the Huffington Post it can be concluded that the correct denominator to choose when analyzing MOOCs might not be the total number of students that enrolled in a course, thus the number of students that clicked "enroll" on the platform, because some of these students are not fully engaged or motivated to take the course, some students might just enroll out of curiosity and not even take the first test or watch the first class since there is nothing to lose by doing so.

So it is safe to assume that "everyone who hits the enroll button on a MOOC web page should be considered the equivalent of a college student who signs up to take a course at their university"? (Haber 2013), probably not.

In the analysis it can be found that instead of using the *total number of students that enrolled in the course* as the denominator, it is used the *total number of active students* (students that logged into the website once after registering) the completion rate rises from 5% to 10%, which might not be considered a significant increase, but it is taken into consideration the *total number of students who complete at least one assignment*, even if it is a short quiz, as the number of really engaged and motivated students, the completion rate has a great increase of 43%.

Sustainability

Due to the early nature of MOOCs, it is yet to be implemented a clear sustainable revenue model, they are in a position where some social networks have been, free-to-use, but later a monetization strategy was needed to cover fixed cost and investments that have been made.

The top MOOCs have large investment behind them, and thus, returns might be expected on the long run, edX has an investment of $60 million from Harvard and MIT, Udacity $22 million from VC funding as well as Coursera that was funded with $16 million (Ferriman 2013). While edX is a non-profit organization both Coursera and Udacity are for-profit companies (Kolowhich 2013), which at some point might expect to get a return on their investment.

A few strategies have been discussed in order to monetize MOOCs (Homes 2013):

- Make students pay for certification – Courses are free, but proof of passing is paid
- Allow schools to pay for sponsored classes – Universities can license MOOC courses to be taught on their campus
- Offer students additional resources – Payment for library resources and tutoring

Plagiarism

When talking about free courses that students take only for their personal improvement, a special motivation for them to cheat will not exist, but when taking courses that offer certification or even college credit, it is important that plagiarism and cheating do not occur.

Of course when talking about online courses, that students take tests behind a computer, it is hard to make sure that the person taking the test is the actual person taking the course, in order to verify the identity of the test taker, MOOC platforms are using two different approaches:

- Signature Track: Used mainly by the largest MOOC platforms, it is a way to ensure the student's identity when taking on-line tests. As stated by Annie Eisenberg (2013) in the New York Times, platforms are now using technologies "worthy of the C.I.A", their software tracks mouse clicks, keystrokes, monitors webcams and computer screens and analyzes typing patterns.
- Test centers: Some MOOCs have created partnerships with test centers internationally in order to ensure that the tests are taken by the student that attended the MOOC as well as he is not able to have outside help. Platforms such as edX have partnered with Pearson VUE in order expand its test possibilities, by allowing students to take tests on their global network of test centers. The creation of test centers will be a major step towards credit bearing classes in MOOCs, as they allow the platform to ensure the credibility of the test taken.

Method and Variables

In order to analyze the key success factors for MOOC platforms, a database was built through an analysis of MOOCs, having in consideration the list available at the *mooc-list.com*, some other platforms were added as they were believe to be relevant for the analysis. Various internal and external variables were set with the objective of having the most complete analysis as possible.

The analysis has two different sides to it, data that is present in the platform itself and data gathered on the online presence of that platform through *alexa.com*, a website that provides the metrics for a given website. As the basis for this research proposition was found in an interesting analysis done by Justin Menard a systems manager at the University of Ottawa (2013) where he compared the Alexa's traffic rank with a compiled ranking of the top 100 universities. He concluded that it was Alexa's traffic rank was able to accurate predict the overall ranking of the universities.

The analysis of a certain platform was done by first enrolling into the platform and then enrolling in an open class and then the data gathered would be compared with the ones found on *mooc-list.com*. Forty platforms were considered and thirty four were analyzed. MOOC platforms that were part of a subdomain or a larger company or university were removed, since *Traffic Rank* given by Alexa, has in consideration the entire website and not just only the subdomain.

Following is a brief description the variables for a better understanding of the results and the discussion, a further description and steps taken to create the database can be found in Exhibit 3.

Platform's Data, gathered from the platform itself, if not found, a reliable source was searched:

- Company Name
- Platform Age: Computed having in consideration the year this thesis was written, 2014
- For Profit or Non-Profit: If the platform is a for profit or a nonprofit organization
- Education content level: Understand what type of education is the platform providing, K12 (high school), College Undergraduate, Graduate School (PhD), Applied (Tutorials) and Programming
- Course count: The total number of courses found on the platform

- Certification or No certification: It was considered if the platform offers, global certificates (completion), Convertibles in college credits and Signature Track (an online identification system)
- Charge or No charge: Do platforms charge for credit, certification or have paid courses
- How tests are taken: if tests are taken online, in person at the university or in third party institutions
- Content Generation: how does the platform generate content, if it is from a partner university professor, from any university professor, from any person or if it is the platforms generating content by itself
- Extensive quiz on registration: if the platforms has an extensive quiz when students are signing up
- Open: if the platform is freely accessible
- Interaction: What type of interactions does the platform provide for the students, through technology (such as videos), directly with instructors, amongst peers and meet up
- Attendance: understand if course attendance is time bound or asynchronous.
- Total languages: Total languages that the platforms has classes in
- Partners: Number of universities, companies, governmental and foundations that a platforms has as partners

As for the online presence most of the data was gathered from *Alexa*:

- Traffic Rank: How well does a platform rank on the overall of the all sites of the internet, is one of the key variables of this study, as success of a platform was assumed having in consideration this variable
- Time on site: how long does a visitor stay on the website
- Education: estimated education level of visitors, it is divided into four different categories, no college, some college, graduate school and college

Results

Using a Spearman's correlation the following significant correlations were found with *Traffic Rank*. It is assumed *Traffic Rank* is the measure of success of the platforms.

It should be noted that a negative correlation with *Traffic Rank* is a positive sign, since *Traffic Rank* is stated by ascending order, meaning that the lower the value the better.

Correlations where found within ten different dimensions of the platform analysis:

Spearman's rho			Traffic Rank	Findings
1. Platform Data	Platform Age	Correlation Coefficient	-,345*	The older a platform is, the more successful the platform tends to be.
		Sig. (2-tailed)	,046	
		N	34	
	Course Count	Correlation Coefficient	-,748**	The higher the course count, the more successful a platform tends to be.
		Sig. (2-tailed)	,000	
		N	34	
	Mobile	Correlation Coefficient	-,542**	Having a mobile version, or application, the more successful a platform tends to be.
		Sig. (2-tailed)	,001	
		N	32	
	Time on site (minutes)	Correlation Coefficient	-,630**	The more time students spend on a platform, the more successful a platform tend to be.
		Sig. (2-tailed)	,000	
		N	33	
2. Type of Education	College Undergrad	Correlation Coefficient	-,397*	Platforms that offer education at a college undergraduate level, tend to be more successful.
		Sig. (2-tailed)	,020	
		N	34	
	Programming	Correlation Coefficient	-,357*	Platforms that offer programing classes, tend to be more successful.
		Sig. (2-tailed)	,042	
		N	33	
3. Certification	Global (Completion)	Correlation Coefficient	-,385*	Platforms that offer a certificate of completion, tend to be more successful.
		Sig. (2-tailed)	,025	
		N	34	
	Signature Track	Correlation Coefficient	-,512**	Platforms that offer a way to ensure students identity online (signature track), tend to be more successful.
		Sig. (2-tailed)	,002	
		N	34	
4. Revenues	Paid Courses	Correlation Coefficient	-,456**	Platforms that offer paid courses, tend to be more successful.
		Sig. (2-tailed)	,007	
		N	34	
	Certification	Correlation Coefficient	-,368*	Platforms that charge for certification, tend to be more successful.
		Sig. (2-tailed)	,032	
		N	34	
5. Tests	Online	Correlation Coefficient	-,406*	Platforms that offer tests online, tend to be more successful. It should be noted the all of the top platforms offer this possibility.
		Sig. (2-tailed)	,017	
		N	34	
6. Content Creation	Partner University Professors	Correlation Coefficient	-,550**	Platforms that have partner university professors creating content, tend to be more successful.
		Sig. (2-tailed)	,001	
		N	33	
	Platform	Correlation Coefficient	,599**	Platforms that create their own content, tend to be less successful than platforms that outsource their content creation.
		Sig. (2-tailed)	,000	
		N	33	

7. Interaction	Amongst peers	Correlation Coefficient Sig. (2-tailed) N	-,403* ,022 32	Platforms that offer a way for students to interact, such as discussion forum, tend to be more successful.
	Meet Up	Correlation Coefficient Sig. (2-tailed) N	-,364* ,041 32	Platforms that encourage students to meet in their geographical area, tend to be more successful.
8. Partners	# of Universities	Correlation Coefficient Sig. (2-tailed) N	-,368* ,035 33	Platforms with partnerships with universities, tend to be more successful.
9. Languages	Total languages	Correlation Coefficient Sig. (2-tailed) N	-,398* ,020 34	Platforms that offer classes in a higher number of different languages tend to be more successful.
10. Demographics	No college	Correlation Coefficient Sig. (2-tailed) N	,782** ,000 19	Platforms should not target people with no college education, since there is a positive correlation (which is bad) with Traffic Rank.

Descriptive statistics of the correlated variables can the found on Exhibit 4.

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

1. Platform Data

This section relates to data of the platform in itself: year founded, country of origin, if it is a for profit or a nonprofit organization, course count, if it was available for mobile browsing, if the platform has an extensive quiz on registration and how long do students tend to be on the website.

Platform Age

It can be seen that *Platform Age* is a statistical significant variable with *Traffic Rank* and the older the platform the higher it is ranked.

It was found that older platforms tend to be more successful than younger platforms, this might be attributed to the name that platforms have created for themselves.

Platforms are not able to influence this variable, since obviously they are at will of when they are created, but it might indicate younger platforms that are not been as successful so far, despite their hard efforts, that if they keep carrying it through they might be able to reach success.

Another significant variables were also found to be statistically correlated with *Platform Age* (Exhibit 5):

A positive correlation with *Course Count* which can explain that the older the platform, it is expected a higher course count, since the platform would have more time to gather content, either created by themselves or from external sources.

A negative correlation with *Asynchronous (Timebound)* attendance can be found together with a positive correlation with *Anytime (Timeless)* attendance, which might lead to believe that the older the platform is, thus its number of courses increasing, it might make courses that previously were time bound to a certain date, available at any time.

Course count

There is an immense discrepancy between platforms, with the maximum amount being 8.000 courses and the minimum amount being 2 courses. It should be noted that there is a great difference in the number of courses offered from the top ranked platforms for the bottom ones.

It was found that course count is highly relevant for the success of a MOOC platform, but a nuance has to be considered when analyzing this data, since MOOCs that only offer time bound classes, meaning that a class starts and finishes at a certain date, are more prone to have a lower course count since they won't make available all the courses they have at one time. This consideration is due to the fact that data was recorded as the amount of courses available at the date of the platform was visited.

It can be believed that course count is relevant for the success of a MOOC platform, because different students are looking for different skills to acquire, thus having a greater availability of courses such as design, business or programming, will attract a larger number of students.

The higher the number of study fields a platform will offer, the highest the probability of becoming a "one stop shop" for students, when looking to learn a new skill, since they would be more familiarized on how the platform works in different areas, from assignment delivery to certification methods.

As it can be seen in Exhibit 5, it is important to consider that *Course Count* is statistically correlated with four out of five types of education that platforms might provide, in this case, *Course Count* has a positive statistical correlation with *College Undergrad, Grad School (Phd), Applied* and *Programming* only not being statistically correlated with *K12* (high school).

It can be understandable that while platforms increase their number of courses available, they will expand into these four different areas in order to target a larger amount of students, mainly due to the current target of MOOCs, expanding into K12 education might not be of their interest.

It is also positively correlated with *Paid Courses*, it might be assumed that as number of classes tends to grow, the platform might have the incentive to start charging for some classes, and for example platforms could start charging for their top classes or for advanced classes on a certain topic.

An important correlation to have in consideration, is the negative correlation with *Platform,* which in this case indicates that content is created by the platform.

This negative correlation indicates that in order for a platform to have a large number of courses should outsource their content creation to either partner university professors, any professor or anyone, this could be mainly to the fact that MOOC courses are expensive to produce, as an example Penn State reported that their MOOC courses cost around $50.000

each, to develop which includes the cost of professors and videography (Popp n.d; Hussain 2013).

Mobile

This variable refers mainly the availability of a mobile version of the platform, or if a mobile application exists that allows students to practically access the information on the platform from a mobile device.

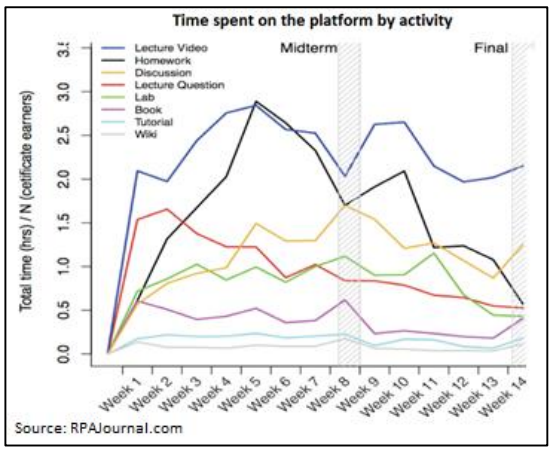
With today's internet traffic strongly growing in mobile devices it is expected that platforms that offer a mobile version, either a website or an application, tend to be more successful than platforms that only offer desktop browsing, it allows students to learn on-the-go with their mobile phones or tablets, for example, a student might listen to a class on their commute to university or work.

Since MOOC classes are usually delivered on video a good comparison in order to narrow down how important it is for platforms to offer a mobile version, is seeing how YouTube mobile platform has evolved when it comes to users. In 2011 just 6% of the YouTube traffic came from mobile devices, and in 2013 it had a great increase to 40% of the YouTube traffic coming from the mobile platform (Constine 2013).

Time on site (minutes)

This variable relates to the time visitors spend in a specified website, and is measured in hours, minutes and seconds.

Also found as correlated with the success of a MOOC platform. This variable was expected to have this correlation, although it might be influenced by the reading of the *Alexa* data, due to the nature of MOOCs, students are expected to spend time on the website, viewing videos and fulfilling assignments or tests, a platform where students pass a lot of time, is engaging students better, thus it is a more successful platform.



It is interesting to understand how students spend their time on the platform, in the research done by a group of MIT and Harvard (2013) researchers named "Learning in the Worldwide Classroom: Research Into edX's First MOOC" an analysis of the total time spent students was done.

Clearly students spend most of their time watching lectures, and it is one of the most constant activities, only dropping closer to the midterm exam. Next students tend to spend time doing homework, which is required to finish and have a certification of the course.

2. Type of Education

This variables related to the type of education offered by the platforms analyzed, it includes K12 (high school) education, College Undergraduate, Graduate School (PhD), Applied and Programming.

College Undergraduate

One of the most surprising findings of this study was the fact that most of the MOOC platforms appear to target or have a biggest focus on *College Undergraduate* classes, apart from Khan Academy most of the other platforms are focused on these type of classes, which appears to be in pair is the current target of MOOCs reviewed in the literature.

Since "consumers" of MOOCs are educated people that want to improve themselves in other areas, it does make sense that a correlation is existent between the platforms *Traffic Rank* and the type of education that they are offering.

This variable is also correlated with *Global (Completion)*, Exhibit 5, which relates to the fact that the platform offers a certificate of completion to students who finish the course. This could be expected as students that are taking classes of this level of education might expect to have a way to prove that they have knowledge in a certain area in case it is needed.

Programming

This type of education was chosen to be in a separate category from the traditional denomination of the types of education, mainly due to the fact that learning to code is becoming considerably important as technology evolves as defended by major tech executives, such as Bill Gates or Mark Zuckerberg in their video "What Most Schools Don't Teach" backed by Code.org, where major tech companies and their founders have invested around $10 million (Layton 2014).

Through the analysis it was found that programming classes were a relevant success factor for MOOC platforms, it is believed to be mainly due to lack of programming courses available at different education levels, either high school or college, in the latest usually only computer science oriented programs will teach programming courses.

Programming is also correlated with *College* (Exhibit 5), being this variable the education from the students that visit the platform, this correlation might help explain that the number of programming courses offered at the university level might not correspond to the level of interested of students, thus students are looking outside of their traditional learning institution for a way to learn how to code.

3. Certification

In this field two types of certification could be found, global (completion) and convertibles (college credits) as well as if a platform has signature track.

Global (Completion)

This variable relates to type of certification offered by the platforms, this type of certification is the certification offered at the end of a course considered that the student has successfully pass the tests and delivered the assignments needed, it does not bare any type of college credit.

Although not yet fully accepted by companies, or most not providing any college credit, having a certificate of completion of the course might make a difference on the student's curriculum, especially because certificates are digital and free, students might prefer to take a course on a platform that recognizes their efforts to pass the class by giving them a certificate of completion instead of a platform that does not provide them that option.

This variable is related with the next statistical relevant variable, *Signature Track*, which ensures student's identity online.

Signature track

Created to solve one of the main challenges of a MOOC platform, plagiarism, different platforms follow different strategies to verify the student's identity online, for example, Coursera creates a biometric profile of a determined student's typing pattern by asking them to type a "Signature Phrase", and every time that student submits a coursework, he is required to retype that "Signature Phrase", and typing patterns will be analyzed in order to ensure student's identity.

It should be noted that only top platforms are using some type of signature track system.

As reported by Mark Piesing (2014) in his article “Researchers Can Identify You From The Way You Type And Use Your Mouse” a study from the University of Oxford researchers were able to identify that the speed an individual types, the way they move the mouse or hold their phone creates a unique pattern. By monitoring 500 different behaviors, researchers were able to create an “eDNA”, electronically defined natural attributes, for each individual.

Adrian Neal who developed the technology while studying at the university, says that the technology is even able to identify if a person has taken drugs, but because it would create a difficult situation for the company, so he chooses to only collect data to ensure the identity of a person.

Despite this project having other implications on the internet usage, this project could be of great use for MOOC platforms that want to ensure student’s identity, it might be a step forward for platforms to start issuing credits and degrees.

This variable is positively correlated with other expected variables (Exhibit 5), such as:

Charge for *Certification*, usually platforms that have a signature track system tend to charge for certification.

Another curious correlation that should be looked into, is the positive correlation with *Third Parties*, which indicates that tests can be taken physically in a platform’s partner which is the ultimately way to ensure a student’s identity.

4. Revenues

In the dataset this field is related on how can platforms overcome one of their key challenges, being sustainable by having revenues. Three categories were considered, if platforms charge for credit, has paid courses and if it charges for certification.

Paid Courses

Paid Courses is related to the two previous variables, and again a way for MOOC platforms to face other of their key challenges, sustainability.

Although offering paid courses goes against what MOOCs stand for, it might not be as big as a problem as it sounds, not only it is helping the platforms address their challenge of sustainability, but are actually helping them overcome their challenge of low dropout rates, Coursera states that students that pay between $30 to $90 to enroll into the Signature Track program are substantially more likely finish the course (Fowler 2013).

As for *Paid Courses* obviously there is a negative correlation with the variable *Open,* which indicates that the platform should be easily accessible and offer free classes. Platforms that offer paid courses tend to not be as open as platforms that only offer free classes (Exhibit 5).

Certification

As for *Certification*, it refers to platforms that offer certification, but it needs to be paid for, meaning that classes are still free but students are required to pay for a verified certificate.

This variable is found to be a success factor for MOOC platforms, because, as platforms evolve and start being more recognized by the universities and companies, having a verified certificate, might actually be accepted as a way for the recruit to prove his knowledge in position required skills.

With *Certification* there is an expected positive correlation with *Convertibles (College Credits)*, meaning that platforms that charge for certification might offer college credits (Exhibit 5), which can lead to the future of MOOCs, students are able to take classes online for credit at their universities.

5. Tests

This field of the database relates on how tests from the platform's courses are taken, it had in consideration three options, online, in person and third parties.

Online

Online, due to the true nature of MOOC platforms, of course it is important that platforms offer students the possibility of taking tests online, it makes it easier for students to assess their knowledge as well as the class teacher, allowing students to obtain a certificate of completion at the end of the course.

Platforms that fail to do so, are restricting too much their test taking options, thus not being able to engage a large number of students.

6. Content Creation

This variable relates to how contents are created for the platform, four options were possible. Content could be created by a university level professor, by a partner university professor by any person or created by the platform itself.

Partner University Professors

Successful platforms tend to have their content created by *Partner University Professors*, which is directly correlated with the number of partner universities later discussed (Exhibit 5).

By having university professors teaching classes on their platforms, MOOCs are able to gain a lot of credibility as it ensures students that classes are of the highest quality possible.

In order to be successful, MOOC platforms instead of looking into replacing universities, might look into partnering with them, increasing their amount and quality of content created.

Platform

In this case, content is created by the platform, without any visible indication on who created the course or on who is the teacher, it tends to be found on the bottom ranked platforms.

This variable is statistically significant but negatively correlated with the success of MOOC platforms (positively correlated with *Traffic Rank*). This variable limits the content

creating to only the platform, while others forms of content creation might be adopted by the platform, such as content from a partner university professor, any university, or any person.

It should be noted that as the rank of the platform does down, the more frequent it is for the platforms to have self-generated content, for example, the bottom 14 platforms analyzed, all have self-generated content.

There is a negative correlation with *Course Count* (Exhibit 5), meaning that a platform that creates its own content is expected to have a lower course count than platforms that outsource their content creation, as mentioned before, creating MOOC courses is an expensive and lengthy process, and by outsourcing this task platforms are able to pass this burden to its contributors.

It is important to take in consideration that this variable is negatively correlated with a great amount of other variables, which is influenced by the fact that a large number of the button platforms are using this way of content creation, such as negative correlations with all the other types of content creation.

7. Interaction

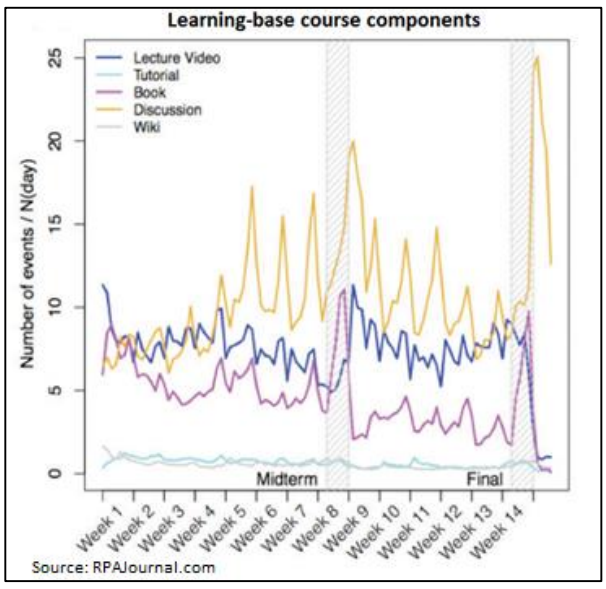
This group of variables has in consideration the interaction between students and between students and the professor. It has in consideration if interaction was made through the use of technology, if there was interaction with the instructors, amongst peers and meet up.

Amongst Peers

Interaction amongst peers relate on how students interact between themselves online, usually a discussion forum is used with this purpose.

It was found that is also important that platforms offer students the possibility to interact with each other.

In a research done by a group of MIT and Harvard researchers (2013) named “Learning in the Worldwide Classroom: Research Into edX’s First MOOC” that focused in studying the behavior of successful students that finished the course with the objective of receiving a certificate, in order to identify common traits and behaviors.



It could be identified how important was the interaction between students on the discussion platform, it is a surprise since students do not have anything to gain from participating and posting in the discussion forum, since no credit is awarded and it is not part of the main course required activities. Although there was a significant number of students frequenting the discussion forum, it should be taken into consideration that 90% of the total forum activity was from students that only went there to view preexisting discussion, which might lead to believe a question of a given student might have been answered before, this the student goes to the forum and already finds its answer, without the need to wait for someone else to reply to his topic, it might as well help the course teacher to understand in which topics are the students having the biggest difficulties, allowing him to change the course contents in order to make them more explicit.

It was also found that students tend to spend more time on the discussion forum closer to homework and test deadlines, at the same time, closer to these dates students tend to spend less time watching videos and doing coursework.

In a keynote at SXSWedu conference in March 2013, Anant Agarwal, edX CEO, described what happened the first time the taught a MOOC (Duhring 2013):

> *"The biggest surprise in my mind was the power of the discussions. With 155,000 students, at first I didn't sleep at night worrying about how to answer questions from students. So, I'm sitting up at 2am after the second day of the course watching the discussions and answering questions as fast as I can. A question pops up. I try to type the answer. But, before I can type the answer, I see an answer pop up from another student, who happened to be in Pakistan. He almost correctly answered the question asked by the first student. I started to write up a correction to the advice provided, and then before I could correct it somebody else popped in with another answer. Then I sat back, fascinated. This was an epiphany for me. Before I knew it, student contributions came in from all sides, discussing the question and going back and forth. And in the end, they got the right answer. As an instructor, I merely blessed it as being correct."*

Platforms should have in consideration how students are using the discussion forum, and how important it is, due to the fact that it helps MOOC platforms overcome a challenge, which is the fact that there is an immense amount of students for just one teacher, by having good discussion forums where students can question and answer each other.

In order to be successful platforms should have a clear strategy to implement their discussion forum, as it should be welcoming for students to ask questions, as well as it should be easy to search and find the most frequent questions, a good search system will avoid a clutter of topics and questions and allow students to finish their assignments faster since they will not need to wait for someone to reply.

Meet Up

Meet Up encourages people to meet personally in their geographic area and its online available in very few platforms, although statistically significant with the success of MOOC platforms, it does not appear to be a key success characteristic for platforms to implement.

8. Partners

This variable has in consideration which and the number of partners a MOOC platform has. Four different types of partnerships were available, Universities, Companies, Government and Foundations/NGO.

Universities

Number of partner universities relates with the number of universities that a platform has as partners, either developing classes or using the platform as a supplement of on-campus teaching. As higher ranked a platform is the higher the number of partner universities is expected.

In the analysis it was found that it was relevant for the success of the platforms, that they have partner universities behind them, there are different reasons that might lead to this.

Content generation from partner university professor might be of a highest quality when compared to freely generated content, also it will drive students from that university to visit the platform, either for them to watch a class again, or in some cases, universities are experimenting a new class approach, called flipped classrooms, where students will listen to the theoretical part of class at home, and then later will come to class prepared for group discussions or exercises.

There are evidences that this new approach of flipped classes blending online and in on-campus classes can increase pass rates of a given class. In 2012 in a test of an on-campus "Circuit and Electronics" class from San Jose State in partnership with edX has improved the pass rate from 55% to 91% (Fowler 2013).

Other significant correlations were also found in the analysis of this variable (Exhibit 5), as for the positive correlations two significant correlations were found. With *Convertibles (College Credits),* which relates to the possibility of a student to get college credits from a specific course available in the platform, it is more likely for a platform that has a higher number of partner universities to offer college credits from its courses. It is obviously positively correlated with *Partner University Professor*.

9. Languages

The languages that a platform offers classes in were also considered when producing the dataset, the languages considered were, English, German, Spanish, Portuguese, French, Russian, Turkish, Italian, Korean, Chinese, Japanese, Arab and Hindi. Later a total count of the number of languages was computed.

Total languages

The *Total Languages* count is negatively correlated with *Traffic Rank* meaning that top platforms tend to offer a higher language count than bottom platforms.

In a quantitative analysis of this variable, the top six platforms were divided due to the great discrepancy of *Traffic Rank* between them and the rest of the sample, the top platforms had an average of 5,3 languages while the bottom platforms had an average of 1,4 languages.

This indicates that in order for a platform to be successful it should expand the languages in which its courses are taught. There are two main ways to achieve this goal, platforms can remake their courses in another languages or by simply add subtitles to their current courses.

Also platforms that outsource their content creation are more prone to expand their language base as they are able to have a better crowdsourcing of their content.

10. Demographics

This variable has in consideration a large number of the Alexa's data that was available across the platforms, such as female users correlation, global reach, page views/visitor, bounce, time on site and the level of education of the platform's visitors.

The level of education of the platforms visitors had four different categories, no college, some college, graduate school and college.

No college

This variable related with the type of education of people visiting the platform, where the different options were, no college, some college, graduate school and college.

One of the major findings on this study is that the most successful MOOC platforms are not targeting not college educated people, but targeting college educated people.

The correlation between students not having college education and *Traffic Rank*, is negative, meaning that in order to be successful platforms should focus on educated people

which goes against their optimistic views of making courses borderless, allowing for anyone to get well educated.

Other studies on MOOCs have also help to substantiate this finding such as "*The MOOC Phenomenon: Who Takes Massive Open Online Courses and Why?"* from the University of Pennsylvania, which was reviewed in the literature.

Limitations

One of the limitations of this study is the fact that the sample gathered is low and it might influence the results, although not all MOOC platforms were analyzed, the most relevant ones were, adding low ranked platforms to the sample would not have a great impact on the final correlations, due to their much lower ranked their key characteristics barely have an impact on the end results.

On the situation of database building some data might be subject to interpretation, although steps were taken to try and minimize this limitations, such as comparing the findings with the information on *mooclist.com* and set predetermined scales for visual data.

MOOCs that only offer time bound courses have their course count lower than MOOCs that offer courses at any time. Here is a case of aggregation of courses (pilling them up) against a situation where MOOCs try to have an interactive class with students participating at the same time, and engaging in course work and discussion together.

Conclusion

Through the analysis of the literature review and later of the results of this study, it can be noted that key success factors found might help platforms overcome their three main challenges: dropout rates, sustainability and plagiarism.

The results also help fundament two important topics in the discussion of MOOCs, their current and future strategy.

Looking at the results found, such as number of partner universities, a strategy of partnership with universities might be for now the best strategy for platforms to follow, as they are able to fully overcome their current challenges, then platforms might be able to further look into competing with universities.

Dropout rates

In the research, two key success factors of MOOC platforms were found to help platforms overcome this challenge, *interaction amongst peers* and *paid courses*.

The results defend that platforms with paid courses tend to be more successful as a student that has paid for the course is more engaged, since it took him more than just hitting the enroll button, thus he is less likely to dropout of the course.

Learning in front of a computer can be an isolating task, having a way to interact might motivate the students to stay on the course, the results show that a platform that offers students the possibility of interaction with each other tends to be more successful than platforms that do not. Platforms should keep developing their discussion forum and other ways of interaction can be followed in order to captivate students, such as group assignments done by webcam or video answers given by the professor to the most common questions.

Sustainability

Results help defend that two key success factors of platforms, *charging for courses* and *certification* is a viable business model. It does not mean that other business models will not work, but currently this is the one top platforms are using.

Results show that students are willing to pay for courses as well as certification, this platforms can take this into their advantage and develop new ways of monetization. Platforms could focus on a freemium approach by charging students even a small amount for having access to premium features, for example the advanced part of a course, with the high number of enrollment fees that the platforms are having, it allows them to generate a massive amount of revenue.

As shown by the results, students look for a way to interact online, platforms can generate other sources of revenue such as mentoring services.

From the universities stand point, with which top platforms are partnering up with, and with the possibilities that a flipped classroom might offer, platforms can charge universities for licensing their content, by doing so, it would allow on-campus professors to have access to student's online data, such as grades, assignments completed and videos watched.

For top performing students platforms might be able to have two potential sources of revenue. It might charge students to be able to be considered by recruiters that look for students on that given platform, and inversely might charge the recruiters to be able to access their student's database in order to find top performing candidates.

Plagiarism

The results show that students prefer platforms that allow them to take tests online, as well as have some type of online identity verification, platforms can challenge plagiarism by using these preferences of the students. By implementing better identification systems, the platforms will be able to have the best of both worlds, tests taken online, but where the student identity is ensured.

This will allow platforms to meet one of their key success factors, global certificate of completion. If ever platforms are doing to challenge higher education they need to go further into certification, attributing credentials and credits.

Third party test taking and signature track go hand to hand when it comes to ensure that it is the student who enrolled in the class, taking the test. There are some situations where it is nearly impossible for course students to reach a test center, such as working professional that are taking courses with the objective of improving themselves, in this situations signature track is the best option.

By implementing better identification system, the platforms will be able to have the best of both worlds, tests taken online, but where the student identity is ensured.

Strategy

Results show that the number of partner universities is a key success factor of platforms, increasing the number of partnerships will help platforms to be more successful.

With the increase of the number of partnerships, new opportunities might arrive, such as the development of new flipped classrooms. Instead of MOOCs aiming to replace higher

education institutions, they might be able to work together and develop a more attractive learning environment for students overall.

By partnering with a higher number of universities platforms will also be able to generate more courses, contributing to another of their key success factors, course count, and are able to target a larger number of students, not only they will target a higher number of students from the partner universities, but they will be able to target more students worldwide and offer higher quality content.

Further Research

Since MOOCs are quite a recent topic the current literature might be updated with some frequency.

With future changes that the platforms might suffer, it would be important to update the database with new variables in order to ensure that all relevant variables are taken in consideration.

It would be interesting to analyze a larger sample of platforms in order to ensure the statistical relevance of the findings.

As the time passes, other top platforms might emerge, and current top positioned platforms might fall, a qualitative analysis on the reasons for that fall would as well provide a great insight on the development of MOOCs.

Framework

A framework allowing to correlate the literature review, the research done and the conclusion was developed in order to understand the impact of the research in different topics.

	Literature	Research	Conclusions
What are MOOCs?	Massive Open Online Courses (George Siemens,2013)	Found that course count is relevant for the platform's success Interaction between students is highly relevant	
Who is using MOOCs?	Targeting educated people (Christensen et al. 2013) Early adopters of technology (Fowler 2013)	Platforms are focused in College Undergraduate and Programming Platforms are not targeting non-college educated people	A snowballing effect might occur, if platforms do not start offering lower level content Creating a different platform targeting non-college educated people would be one solution
How will MOOCs change education?	MOOCs are a disruptive technology (Yuan and Powell 2013) MOOCs are far from replacing higher education institutions (Yuan and Powell 2013)	Platforms are focused in creating ways to ensure student's identity	Higher education institutions and MOOC platforms should work together to create a new way of teaching
Why MOOCs? Platform's Challenges	High dropout rates Sustainability Plagiarism (George Siemens 2013)	Paid courses help reduce dropout rates by increasing student's engagement and are a source of revenue for the platform Platforms are using third party test centers and signature track fight plagiarism	Better discussion platforms will engage students better A freemium approach could help platforms generate revenue New technologies are being developed such as "eDNA" that in the future will help platforms improve their student recognition

Exhibits

Exhibit 1

Top platforms

edX	coursera	UDACITY	KHAN ACADEMY
Non-profit organization launched in 2012. Founded in partnership by the Massachusetts Institute of Technology (MIT) and Harvard University. It had a $60 million investment from both universities.	For profit organization launched in 2012. Investment of $16 million by venture capitalists.	For profit organization launched in 2012 Created by a then professor of the Stanford University Funded by venture capitalists in $22 million.	Non-profit organization founded in 2008. Backed the Bill & Melinda Gates foundation.

Exhibit 2

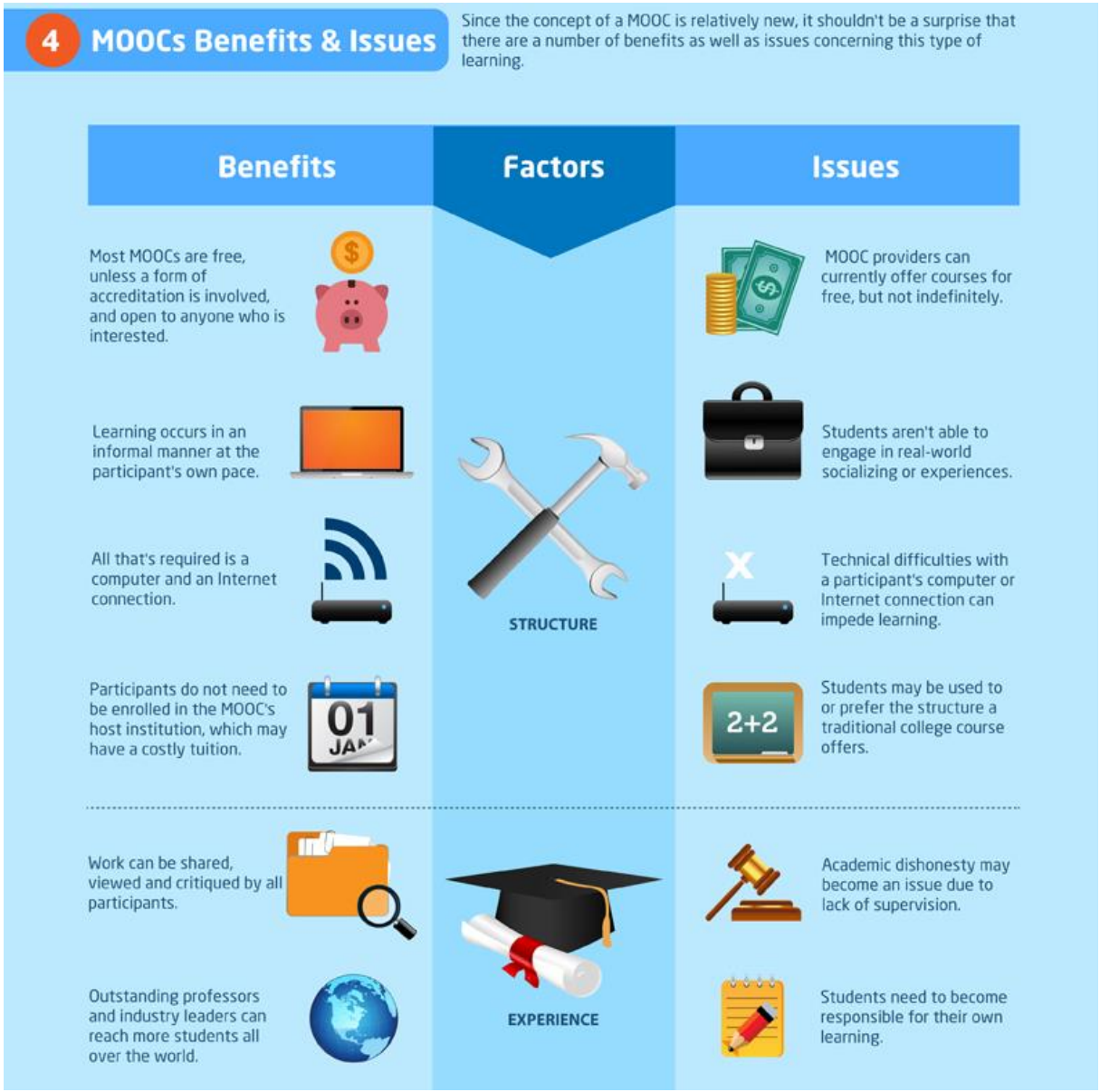

4 MOOCs Benefits & Issues
Since the concept of a MOOC is relatively new, it shouldn't be a surprise that there are a number of benefits as well as issues concerning this type of learning.
Benefits
Factors
Issues
Most MOOCs are free, unless a form of accreditation is involved, and open to anyone who is interested.
MOOC providers can currently offer courses for free, but not indefinitely.
Learning occurs in an informal manner at the participant's own pace.
Students aren't able to engage in real-world socializing or experiences.
All that's required is a computer and an Internet connection.
STRUCTURE
Technical difficulties with a participant's computer or Internet connection can impede learning.
Participants do not need to be enrolled in the MOOC's host institution, which may have a costly tuition.
01
2+2
Students may be used to or prefer the structure a traditional college course offers.
Work can be shared, viewed and critiqued by all participants.
Academic dishonesty may become an issue due to lack of supervision.
Outstanding professors and industry leaders can reach more students all over the world.
EXPERIENCE
Students need to become responsible for their own learning.

Exhibit 3

In order to code the platform a protocol had to be set in order to guarantee that the data is entered is consistent all over the analysis:

1. In order to identify the year the platform was created, a few processes should be followed by the given order. First look into the platform's about page, check if there is any reference to the date of creation, if the data is not available the following step is trying to find it on a reliable source online, if it is still not available a *whois* of the platform's domain should be used and later verified with news or articles found online.
2. To compute the platform's age it was taken in consideration the current year (2014) minus the year of the platform creation.
3. Next to gather platform data, register and log into the platform.
4. Go into the courses offered and verify the number of courses, as well if there are any paid courses.
5. What type of education is offered:
    a. K12 – Primary and Secondary education. Evidence is stated when introduction or clear primary or secondary education can be found, such as "Introduction to Math" or "Geometry".
    b. College Undergraduate – Undergraduate level classes. Evidence can be stated when undergraduate classes such as "Introduction to Finance" can be found. Classes from higher education institutions may also help to support evidence.
    c. Grad School (PhD) – PhD level classes. Evidence can be stated when PhD classes such as "Advanced Statistics" can be found.
    d. Applied – Practical courses. Evidence can be stated when practical courses such as "Photoshop 101" can be found.
6. Enroll into a course and verify if the course offers certificates of completion and has signature track, if not, choose another random course and verify again. In the case of the course offering certification, verify if it offers college credits. After enrolling in this classes, verify how tests are taken, online, in person (at a partners university for example) or at a third party institution.
7. Charge/No Charge: in order to access how to platforms make money, when browsing through the platform it should be looked if the platform has charges for college credits, has paid courses or charges for certification.
8. Content generation: Access how content in the platform is generated, by a partner university professor, any university professor, any person or platform generated, there

are different situations where this information can be found.
It is a good indicator that the content is generated by a partner university professor when inside the page of a selected course, it has the name and university of the professor teaching the course. The field of any university professor and any person is usually find in a sign up page, it would be mentioned if candidates should be university professors or if anyone can teach. Platform generated content is assumed when no information on who teaches the courses is found and not sign up page is available for people to create a course or to apply in order to be accepted to create a course.

9. As for the extensive quiz in registration, it can be found when the enrolment in the platform is made, it when coding, it also should be verified if when enrolling into a class an extensive quiz is found. It might be important for MOOC platforms to have this informational, to later sell to employees in order for them to recruit the best candidates.
10. Open: The platform should be easily accessible and should have free classes for students to attend in order to count as an open platform.
11. Interaction, four major points can be found:
    a. Technology – Meaning that interactions with students use new technologic ways, such as videos or interactive quizzes, not only written texts for students to read.
    b. With instructors – Despite of all the difficulties that an instructors might have due to the fact that it has it might have thousands of students, the class discussion forums should be verified in order to understand if the instructor replies to students or if he creates topics for students to discuss.
    c. Amongst peers – Verify if students have the possibility of discussing between themselves or answering to each other.
    d. Meet Up – Verify if platforms offer a way for students to find peers that are on the same geographic location in order for them to study or complete coursework together.
12. Attendance, what is the timeline where students might take the course:
    a. Synchronous: A time bounded attendance possibility, meaning that students are actually required to be at a specific time on the platform to listen to classes, and if they miss that time, they will not be able to watch the class again.
    b. Asynchronous: A time bounded attendance possibility, meaning that students have time constrains when watching and finishing assignments, but can still

watch the classes at their own pace in the time window given. Usually it is found that asynchronous attendance is weekly, with students having to deliver the required course work by the end of the week.

c. Anytime: A timeless attendance possibility, where students can watch the classes and finish course assignments at their own pace as classes are always available.

13. Teaching languages available: To verify what teaching languages are available, on the course list verify if there is an existence of filter by language, then verify if the course page is translated in other different languages, and later verify if and in which languages are the videos spoken or subtitled. At the end, if should be certified with the help of the *mooc-list.com* which indicates in which languages a certain course is given. Later a language count was computed into the platform.
14. Partners: It should be looked for a page of partners, such as universities, companies, government and foundations.
15. To finish the platform analysis, the FAQ (frequent asked questions) page should be found in order to strengthen the previous findings, and in any case of information missing to be able to find it.

Later the online presence of the platform should be analyzed, through *alexa.com* how it ranks on the overall internet, and what are the platform estimated demographics.

1. Subdomain: Is the platform part of a larger website, making it a subdomain of a lager website, this should have taken in consideration since being part of a larger website does influence the traffic rank of a determined platform.
2. Mobile: In order to access if the platform offers a mobile version, it should be verified if mobile apps are available, and if a mobile subdomain is available, later it is important to verify if a the platform has a "Responsive Design", in order evaluate if the platform follows this design, a mobile device should be used to log into the platform.
3. All the other remaining variables such as, total reach (estimated), total page views (estimated), female users, traffic rank, global reach %, global page views %, page views/visitor, bounce %, time spent on the site, education and geographic reach by country, should be look in *alexa.com*.

Exhibit 4

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Platform Age	34	0	19	2,91	3,895
Course Count	34	2	8000	373,09	1418,273
College Undergrad	34	0	1	,82	,387
Programming	33	0	1	,70	,467
Signature Track	34	0	1	,12	,327
Paid Courses	34	0	1	,21	,410
Certification	34	0	1	,24	,431
Partner University Professor	33	0	1	,27	,452
Platform	33	0	1	,58	,502
# of Universities	33	0	99	7,27	19,231
Asynchronous (Timebound)	33	0	1	,52	,508
Anytime (Timeless)	33	0	1	,61	,496
Grad School (PhD)	34	0	1	,09	,288
Applied	34	0	1	,53	,507
Global (Completion)	34	0	1	,71	,462
College	19	-2	3	-,42	1,261
Third Parties	34	0	1	,18	,387
Open	34	0	1	,97	,171
Convertibles (College Credits)	34	0	1	,21	,410
Any University Professors	33	0	1	,09	,292
Any Person	33	0	1	,12	,331
Valid N (listwise)	19				

Exhibit 5

Correlations

Variables		Traffic Rank	Course Count	Asynchronous (Timebound)	Anytime (Timeless)
Platform Age	Correlation	-,345*	,542**	-,504**	,584**
	Sig. (2-tailed)	,046	,001	,003	,000
	N	34	34	33	33

		Traffic Rank	College Undergrad	Grad School (PhD)	Applied	Programming	Paid Courses	Platform
Course Count	Correlation	-,748**	,397*	,370*	,409*	,443**	,501**	-,451**
	Sig. (2-tailed)	,000	,020	,031	,016	,010	,003	,008
	N	34	34	34	34	33	34	33

		Traffic Rank	Global (Completion)
College Undergrad	Correlation	-,397*	,548**
	Sig. (2-tailed)	,020	,001
	N	34	34

		Traffic Rank	College
Programming	Correlation	-,357*	,511*
	Sig. (2-tailed)	,042	,025
	N	33	19

		Traffic Rank	Certification	Third Parties
Signature Track	Correlation	-,512**	,658**	,549**
	Sig. (2-tailed)	,002	,000	,001
	N	34	34	34

		Traffic Rank	Open
Paid Courses	Correlation	-,456**	-,342*
	Sig. (2-tailed)	,007	,048
	N	34	34

		Traffic Rank	Convertibles (College Credits)
Certification	Correlation	-,368*	,575**
	Sig. (2-tailed)	,032	,000
	N	34	34

		Traffic Rank	# of Universities
Partner University Professor	Correlation	-,550**	,848**
	Sig. (2-tailed)	,001	,000
	N	33	33

		Traffic Rank	Course Count	Partner University Professor	Any University Professors	Any Person
Platform	Correlation	,599**	-,451**	-,713**	-,368*	-,433*
	Sig. (2-tailed)	,000	,008	,000	,035	,012
	N	33	33	33	33	33

		Traffic Rank	Convertibles (College Credits)	Partner University
# of Universities	Correlation Coefficient	-,368*	,421*	,848**
	Sig. (2-tailed)	,035	,015	,000
	N	33	33	33

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

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