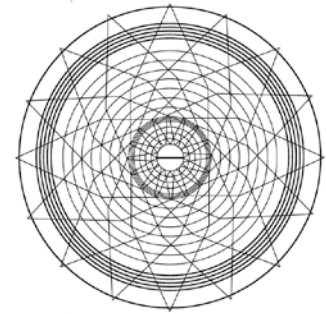[**Scientific Articles**]

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MEASURING THE EFFECTIVENESS OF NEWS LITERACY EDUCATION THROUGH A MOOC:
WHAT WE CAN LEARN FROM THE BEHAVIORAL DATA AND LEARNING ANALYTICS FOR BETTER PEDAGOGICAL STRATEGIES

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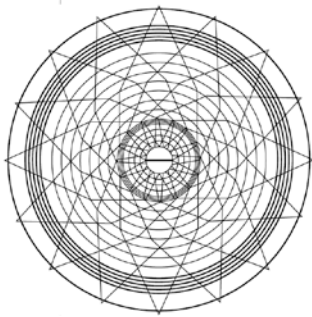The University of Hong Kong
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Abstract:

This paper discusses a Massive Open Online Course (MOOC) on news literacy taught by the researcher entitled "HKU04x Making Sense of News," which was provided on edX, the non-profit online education portal founded by the Massachusetts Institute of Technology and Harvard University, between May 19 and June 29, 2015. More than 7,500 students from 147 countries were enrolled in the six-week course. The preliminary research presented in the paper taps into the large quantity of student demographic and behavioural data that logged every single mouse click, video player control, activity participation and all the other interactions between each learner and the learning platform to explore how educators could take advantage of the learning analytics. It focuses on specific variables, such as the relationship between the frequency of discussion forum posts and assignment grades, and educational background and overall assignment scores. The findings demonstrate the possibilities and future directions of news and media literacy teaching and research in the digital age. The paper discusses some of the pertinent key elements of news literacy education in today's technologically interconnected societies, while exploring the idea of future computer modelling that could provide move insight into the design of effective curricula, instructional designs, technological architecture and other teaching plans and strategies.

Keywords: MOOC, online education, media education, news literacy, behavioral data, pedagogy, learning analytics, journalism education

Introduction

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In the age when the rapid development of digital communication technologies constantly morph the ways people interact with media content through a web of networked information architecture, one of the biggest challenges for media educators is to find ways to guide the future generation of discerning media audience who could critically assess media messages they encounter every day.

The goal of today's media literacy education, therefore, is to help students develop actionable skills to navigate effectively through the information overload. Interest in educational programs that are designed to instill such abilities has been growing on a global scale. As a result, media literacy education and its pedagogical approaches have been diversifying in terms of the nationalities and disciplines of educators and researchers represented in the field (Hobbs, 2010; Mihailidis, 2012; Potter, 2010). Hobbs (2010) defines media literacy as a "constellation of life skills that are necessary for full participation in our media-saturated, information-rich society" (p. vii). Silverblatt and Eliceiri (1997) describe it as "a critical-thinking skill that enables audiences to decipher the information that they receive through channels of mass communications and empowers them to develop independent judgments about media content" (p. 48).

Among different approaches to teach the "life skills" and "critical-thinking" mindsets, news content requires a somewhat different pedagogical strategy because, unlike other types of media products such as movies and fictional novels, news stories are considered to be representing "real" people in "real" events. Although the actual practices differ from country to country, in general, the conventional understanding is that there is a sanctified line between news (reality) and fiction (imagination) in the media industry, and journalists are often seen differently from other types of media content producers such as movie directors (Fleming, Hornik, & Kajimoto, in press).
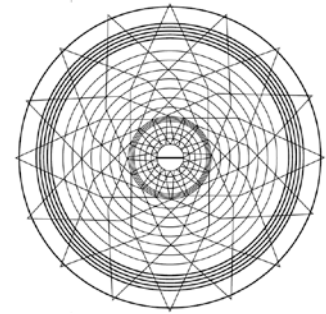
Thus, news literacy instruction, in contrast with the "catch-all" media literacy education, is considered by some educators as a specialized approach (Adler 2014; Fleming 2014; Hornik & Kajimoto, 2014; Jolly 2014; Klurfeld & Schneider, 2014; Loth 2012; Mihailidis, 2012). Although it shares many of the same analytic goals of media literacy education, the lessons and activities often zero in exclusively on news content and also focus on the production process (Hornik & Kajimoto, 2014; Klurfeld & Schneider, 2014). The United Nations Educational, Scientific and Cultural Organization (UNESCO) has also developed a media and information literacy (MIL) program within the framework of journalism education in recent years with model curricula that follow some aspects of journalism training (Lee, Lau, Carbo, & Gendina, 2013; Wilson, Grizzle, Tuazon, Akyempong, & Chueng, 2011).

On the Internet, 2015 saw a few Massive Open Online Courses (MOOCs) that are designed to advance the news literacy education – or media literacy education with specific focus on journalism – for the first time in this field. The author of this paper launched his six-week "Making Sense of News," on edX, the non-profit online education portal founded by the Massachusetts Institute of Technology and Harvard University, in May. The Arizona State University offered a course titled "Media LIT: Overcoming Information Overload" on edX at the end of June. In August, the

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University of Melbourne started its course, "Journalism Skills for Engaged Citizens" on Coursera.

This paper examines the learning analytics of the Making Sense of News and analyzes its massive behavioral data extracted at the end of the course. By taking advantage of the level of detailed user data with a large sample size mined through the MOOC, which could have not been gathered through the conventional research methods in classrooms, this study aggregates and investigates the varying patterns of learning. The quantitative approach taps into the large quantity of students' demographic information and usage logs that tracked down every single mouse click, video player control, activity participation and all the other interactions between each learner and the learning platform.

The findings are believed to demonstrate the possibilities and future directions of news and media literacy teaching and research in the digital age. The paper discusses some of the pertinent key elements of news literacy education in today's technologically interconnected societies while exploring the idea of future computer modeling that could give more insight into the design of effective curriculum, instructional design, technological architecture and other teaching plans and strategies.

Methodology

As pointed out by Raffaghelli, Cucchiara, and Persico (2015), there seem to be no coherent research methods in the field of MOOC research as the problems encountered by education researchers are rather new. They argue that conventional educational studies wouldn't' be suitable for analyzing MOOCs because the free online courses have "large cohorts of students, very large amounts of data and new ways of learning determined by unprecedented freedom of choice" (p. 490).

Literature reviews on MOOC research indicate that many scholars consider the academic inquiry into the new education platform as its exploratory and experimental stage as there are many new factors and criteria that define the effectiveness of teaching and learning such as diverse background of the participants, user engagement, retention/attrition rate, platform interface, online tools, navigation system, social learning and so forth. The aims of MOOC providers also greatly differ. Some treat them as an extension of public education and open learning initiatives, some see them as disruptive paradigm shifts in higher education, others see them as a testing stage for the "blended" mode of on-campus teaching and learning (Ebben & Murphy, 2014; Gasevic, Kovanovic, Joksimovic, & Siemens, 2014). Not many studies, in fact, have reached the stage of testing particular hypotheses or drawing general conclusion that could affect policymaking and pedagogical overhaul, according to the meta-analysis of literature by Raffaghelli, Cucchiara, and Persico (2015).

The research presented below is also a preliminary exploration of the demographic and behavioral data. It scrutinizes the high volume of learner data available for analytic purposes and tries to draw some insights for future computer-based educational
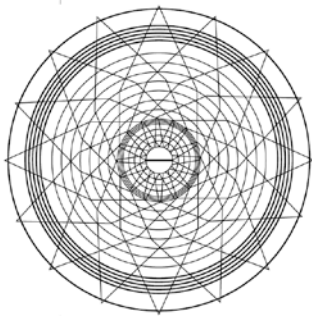
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effectiveness research in the filed of news literacy education that could be applicable under different circumstances. O'Reilly and Veeramachaneni (2014) eloquently put the advantage of the dataset mined through MOOCs, which not only include the conventional "teaching material, student demographics and background data, enrollment information, assessment scores and grades" but also the behavioral data such platform records as "through input, every mouse click, video player control use, and every submission to the platform such as problem solution choice selection, solution composition or text entry for a forum discussion." They argued that "the level of recorded detail of behavior in a MOOC vastly surpasses that recorded in conventional settings" (p. 29).

Demographics of the students

1. Overall enrollment: The online news literacy course taught by the author ran between May 19 and June 28, 2015. More than 7,500 students from 147 countries have enrolled in the six-week course. However, as is often the case with free online courses, the number of "active" users were lower than the "registered" users. The active students, who engaged in the course content at least once when it began, was 2,150 in the first week. The number of active students significantly dropped in the second week to 1,537 and from there the dropout rate became steady (about 150 per week). In the fifth week when the final assessment was included there were 1,019 active users (the sixth week only had course summary and some bonus content but still recorded 938 active users).
The trend here follows a typical pattern of MOOCs but the huge drop after the first week could also be due to the fact that the first assignment required heavy workload for the students as they were required to assess five submissions by their peers. The exit survey anecdotally supports this assumption as many users commented that the peer assessment was too time-consuming and they decided not to complete the task.
*2. More male students than female students:* Among the active learners who declared their genders (many online students decline to reveal this information when they register), the course had 43 percent female learners and 53 percent male learners. It is notable because there seems to be a consensus, at least anecdotally, among the university educators that media and journalism-related academic subjects attract more female students than male students on campus in many countries despite the socio-cultural and economic differences among them. On the MOOC, however, male students were the majority. This requires further investigation as the gender dynamics might have affected the online forum discourses.
3. More mature students with higher degrees: Age-wise, about 37 percent were below 24 years of age and 36 percent were between 25 and 39 years old while 27 percent were older than 40. Considering that 63 percent of the participants are "mature" students (age 25 or above), in the future, the pedagogical design and instruction might need to be adjusted to reflect the diversity of age groups on MOOCs.

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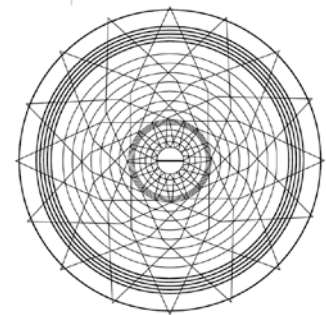
Also notably, about 35 percent of the active users, who input their educational backgrounds, hold a Bachelor's degree and 28 percent have attained a Master's degree. In total, the vast majority of the students (95.3 percent) have completed at least high school education and many have much higher degrees including a PhD (4 percent), which suggests that as far as this particular MOOC is concerned, it attracted a diverse group of participants with varying degrees of educational training.

4. Countries and language preference: The United States was by far the most represented country both among the registered users and active students with about 17 percent of the total population, followed by Hong Kong (11 percent). A sizable portion of students was from mainland China (10 percent), India (7.5 percent), the United Kingdom (3 percent), Canda (2.8 percent) and Japan (2.5 percent), among the registered users. Interestingly, among the active students, however, 5 percent of the population came from the Philippines although the country ranked at 15th in terms of registration (1.3 percent). It should also be noted that more than 3 percent of the registrants decided not to enter their country of origin when they signed up.

The entrance survey (n=596) indicated that 87 percent of the students are "comfortable" or "very comfortable" with the English language. More than half of them (57 percent) said they looked at the subtitles "often" or "all the time" that accompanied the instructional video clips. Although all clips offered subtitles in two languages – English and Simplified Chinese – overall majority (92.7 percent) said they preferred the English language while 4.9 percent said they relied on both.

Findings

1. Average grade: As stated before, there were five assessment tasks in the course. In the four assignments, the mean score was noticeably lower than the median and mode (see Table 1 below). This indicates that there was a cluster of students who scored disproportionately lower than the others and brought down the arithmetic average in those assignments – the reason for this is debatable. It could be that a group of students did not seriously tackle the assignments; or it could be that they really needed more guidance and instruction compared with the others.

Table 1. Average assignment scores

	Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5
Mean	0.61	0.62	0.70	0.64	0.39
Median	0.70	0.80	0.84	0.80	0.40
Mode	0.70	0.80	0.84	1.00	0.00
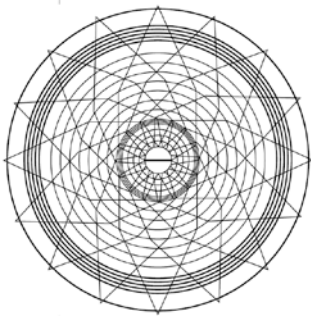
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2. Grade and educational background: Although it is not fair to directly compare different degree holders as the sample sizes significantly differ, it is worth noting that the data show the secondary school (high school) education could be the necessary foundation to fathom the news deconstruction skills taught in the course that were tested through Assignment 3 though 5; those who do not hold the high school diploma scored significantly lower in the three assignments that tested such skills (Figure 1). The data also suggest that a higher degree might not necessarily indicate the level of news-related critical thinking ability, as the difference among Bachelor's, Master's and PhD degree holders were not evident.
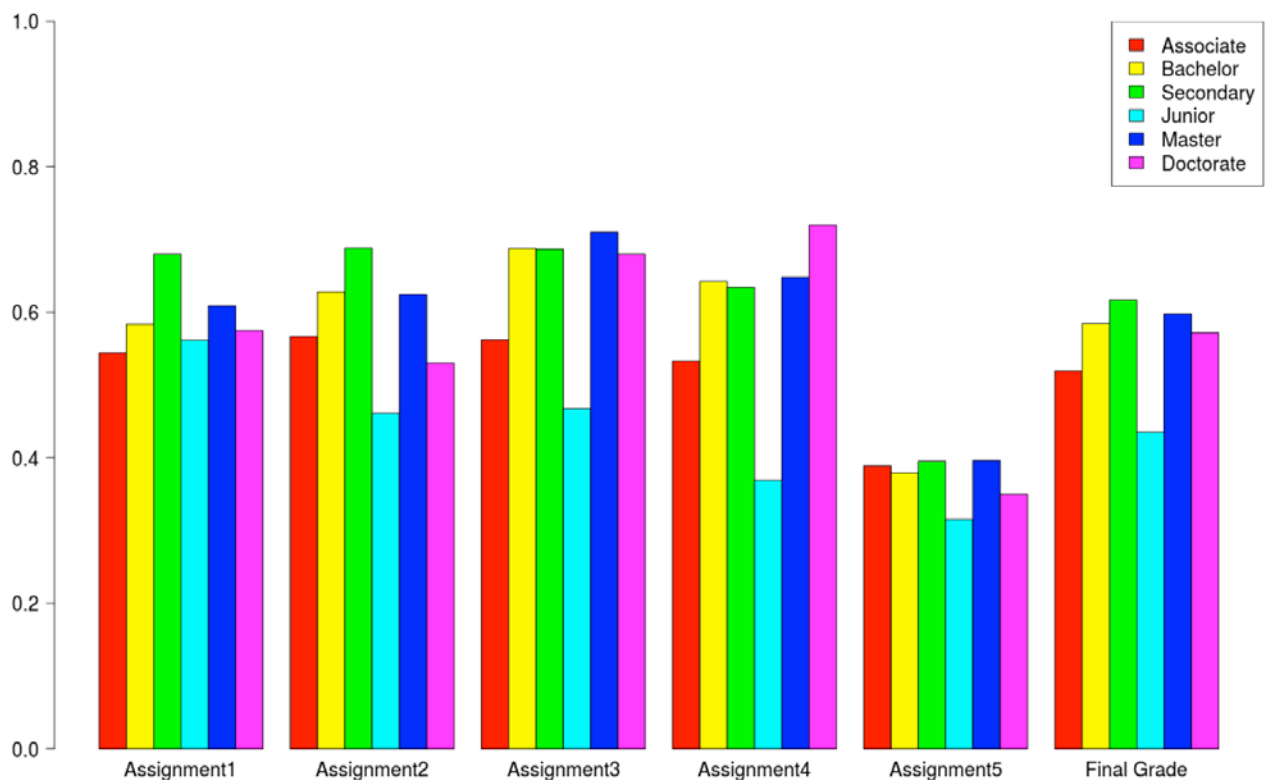

**Figure 1.** Average scores and educational background

3. Forum engagement and grade: One of the key essences of online courses is the discussion forum where students can interact with each other and the instructor. The six-week MOOC recorded 954 forum posts at the end. Interestingly, the heist scoring top 20 students in the course did not engage in the forum discussion at all with only one or no forum post, except for one student who was quite active with 28 entries. The analyses of the 20 average (mean, median, mode) students show, meanwhile, that majority of them were more frequently posting comments and responding to the discussion questions.

The study also looked at the 20 most frequent commenters. They, in fact, achieved much higher grades than the average students. The findings imply that forum

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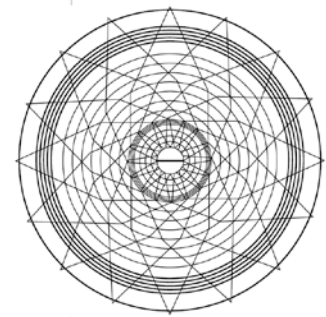
engagement may not be that important for top students while some interactions and participation in the discussion would possibly help other learners understand the course material better although such correlation doesn't prove causality and requires further research. The scatter plot and regression analysis of the relationship between the number of posts and the overall grade (Figure 2) support this as no-forum-engagement students mostly scored lower (with the exception of really high scoring students who also did not engage) while there is no significant grade difference between those who participated in the discussion moderately and those frequently.
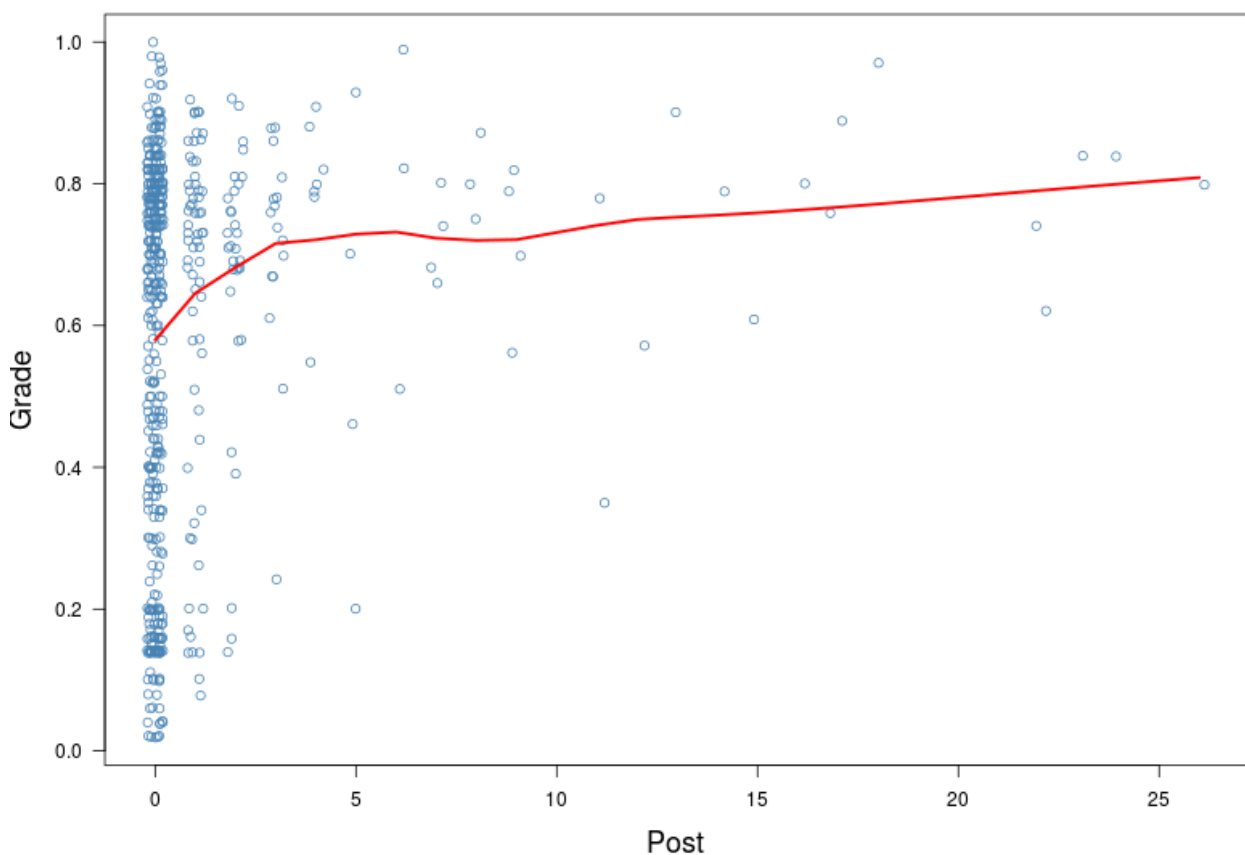

Figure 2. Number of posts and average grade

4. Video playback: The six-week course featured the following video material:
-    26 lecture video clips (about 3-4 minutes each)
-    12 key lesson summary (about 1 minute each)
-    19 discussions with students (2–4 minutes each)
-    5 others such as assignment instructions (2-4 minutes each)

The every single video playback click stream by each student for each clip has been analyzed. Overall, there are three noticeable behavioral patterns across the video content. First, whenever the instructional video shows some texts, charts or other
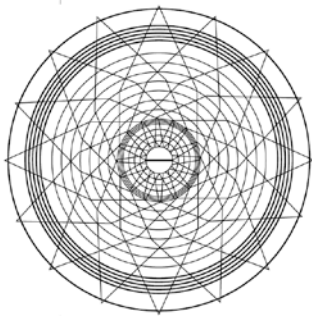
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graphical elements that are closely relevant to the lecture, many students paused the video even though the same information (the identical text and graphics) is posted just below the video player on the page. The second interesting pattern is that while the number of "replays" varied widely for lecture content, the key lesson summary video clips were more frequently watched more than once. Third, the discussions and Q&As with the students were not popular in comparison with the other materials. In the exit survey (n=146), the lecture videos were rated the "most useful" (4.6 in the scale of 1 to 5) and the discussion content the least at 3.8 in the user ratings.

Interestingly, more than a few students commented in the survey that they mostly read the transcripts of the video material (which is shown alongside the video clips and is downloadable) rather than watching the actual clips. These comments came from some top-scoring students and this learning pattern seems to chime with the fact that the top students did not engage with the forum discussions. In other words, those who are quick to understand and internalize the concepts to tackle the assignments, they preferred reading the texts, which are often faster than watching the video, and work on the assignments without asking questions or wanting to know other students' reactions.

Discussion

The Making Sense of News was an attempt to design a specialized online news literacy course (as opposed to all-inclusive media literacy course) for the general public that has a universal application around the world. It has adopted what Fleming (2014) called the "journalism school approach" in which the instructional theories were drawn on journalistic methods and mindsets (see also, Klurfeld & Schneider, 2014; Loth, 2012; Fleming, Hornik & Kajimoto, 2016). Although it is perhaps pedagogically not plausible to design a course that satisfies the learning needs of a large number of students with varying educational backgrounds from different countries, MOOCs can offer unprecedented amount of students' behavioral data that can be explored to pinpoint the effectiveness of each instruction, assignment, exercise, and all other teaching and learning activity.
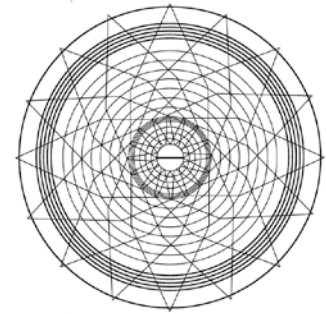
This paper presented some of the preliminary data analysis to illustrate the potential of online-based media education research. It sketched out some of the many possibilities MOOCs could shed light on when researchers delve into the big data. This emerging teaching and learning platform could provide an all-in-one platform for education research whereby the researchers can combine entrance/exit survey, demographic information, learning patterns, the results of knowledge tests, forum commentaries in the class discussions, academic performance and other variables altogether. The dataset can be examined in a wide variety of ways to see whether there is a correlation among different variables; for example, whether or not learners' educational backgrounds correlate with the level of certain news literacy skills.

The online platform makes it easy to test different pedagogical methods to teach news literacy. For example, a researcher could produce two or three different instructional

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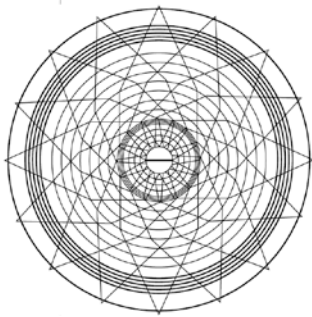news literacy education through a MOOC*

video clips with the same script – one with the instructor talking with his/her face shown, one with an avatar replacing the instructor's face, and one with a professional TV talent taking the role of instructor. The three clips can be randomly assigned to different students. Later, the effectiveness of each clip could be measured by the results of quizzes that follow immediately after the video. Such A/B testing normally won't work in a lab setting as standardizing the test-takers' individual abilities would be next to impossible, but the large sample size that a MOOC can provide could possibly alleviate such concerns greatly. With the same method, two different news articles can be given to the students with only one word changed. It would be interesting to see if the choice of one word over the other would affect the ways students detect and evaluate media biases.

The written communications among the students can be tracked down, mapped and combined with other variables, which could form a foundation for qualitative research as well, although the preliminary study presented in this paper lacked such analysis. The qualitative dataset allows researchers to see how each student engages with one another through peer-reviewed assessments and forum discussions. If, for instance, there are two clusters of engagements among high news literacy skill students (group A) and low news literacy skill students (group B) that were organically formed, the data could indicate that they (the group A and B) are not communicating with each other. We can qualitatively analyze their digital conversations and possibly distinguish some key elements that might tell us why certain instruction works with some and not with others.

The detailed video playback data also reveal many things. The exact points where the students paused or fast-forwarded or rewound the video clip can indicates not only how students interacted with the video lectures but also what visual cues disappeared too hastily (pause), or which parts were redundant or unnecessary (fast-forward or "forward seeks"), or what concepts and explanations were difficult to understand (rewind or "backward seeks"). The click through data and other web analytics data reveal many other factors that would inform the educators; for example, how much time students spent to complete different exercises and assignments, what time/day they accessed the teaching materials and so forth, all of which could provide valuable information for educators to improve the teaching strategies.

MOOCs could potentially give great insights into the design of effective pedagogy while presenting opportunities for scholars to test a multitude of pedagogical designs, teaching methods and research hypotheses in a large scale (O'Reilly & Veeramachaneni, 2014; Veeramachaneni, Dernoncourt, Taylor, Pardos, & O'Reilly, 2013). Ultimately, this kind of research should evolve into a computer modeling that could identify some key predictors while measuring the effectiveness of educational intervention in the field of news and media literacy. In the future, one of the possible trends that could also develop along with this technology is online-based learning platforms that organically morph and optimize the tuition for every user at the personal level, based on the kind of learning analytics and research findings discussed in this paper.

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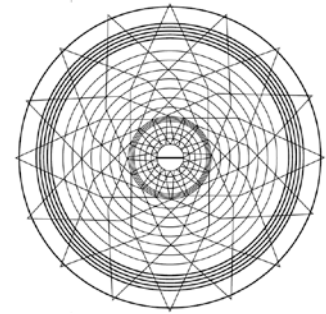
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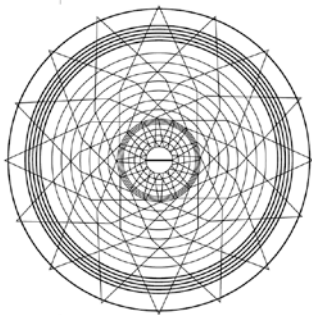
ИЗМЕРЯЯ ЭФФЕКТИВНОСТЬ ОБУЧЕНИЯ НОВОСТНОЙ ГРАМОТНОСТИ ЧЕРЕЗ МАССОВЫЕ ОНЛАЙН КУРСЫ:
ЧТО МЫ МОЖЕМ УЗНАТЬ ИЗ ДАННЫХ О ПОЛЬЗОВАТЕЛЬСКОМ ПОВЕДЕНИИ И КАК ИСПОЛЬЗОВАТЬ АНАЛИТИКУ ДЛЯ УЛУЧШЕНИЯ СТРАТЕГИЙ

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Аннотация:

В представленной статье автор анализирует эффективность курсов массового образования на материале шестинедельного онлайн курса для обучающихся со всего мира «Осмысляя новости» (Making Sense of News). Автор на массиве данных курса, которые содержат информацию о каждом действии слушателей курса, выводит закономерности и инструменты, которые позволяют повысить эффективность курса.

Курс был проведен на открытой онлайн-платформе, основанной Массачусетским Институтом Технологий и Университетом Гарвард. На курс записалось более 7,500 студентов из 147 стран мира.

Исследователь обращает особенное внимание на некоторые переменные, такие как отношение между частотой участия в дискуссиях на форуме и оценками за выполненные задания, а также отношение между уровнем и направлением образования человека и его оценками за курс.

Некоторые выводы демонстрируют новые возможности для обучения и повышения уровня медиаграмотности, а также медиаобразования в цифровую эпоху. Перспективы исследования могут дать материал для анализа всем, кто заинтересован в будущем образования, массовом образовании в информационном обществе, кто изучает возможности медиаобразования и его роли во всестороннем развитии человека. Автор не исключает, что нынешние тенденции развития приведут к персонализации процесса онлайн-образования, когда образовательная платформа будет подстраиваться под конкретного учения, выстраивая на основании аналитики наиболее оптимальную для этого пользователя схему обучения, получения и закрепления новых навыков.

В завершение статья дает несколько практических рекомендаций для тех, кто занимается организацией курсов и платформ онлайн-образования.
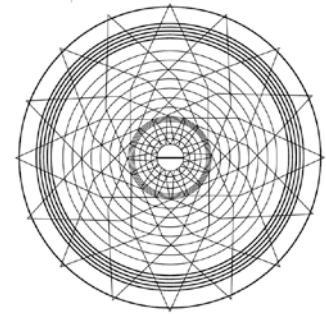
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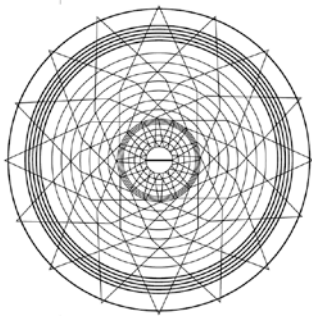
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