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Re-Thinking Vygotsky: Applying Social Constructivism to Asynchronous Online Courses utilizing the Power of Crowdsourcing

Research-in-Progress

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Abstract

Web 2.0 technologies have dramatically changed the way businesses communicate today and the rise of crowdsourcing is largely seen as an online, distributed model for problem-solving across industries. The maturity of web 2.0 technologies has also increased learners' interest in online courses. However, the results obtained from online courses are highly debatable in terms of motivation, course completion rates and actual learning that occur. This paper is a call to apply social constructivism approach to online courses, using the power of crowdsourcing to collect educational resources around online courses and using crowd workers as More Knowledgeable Others (MKO's) in online one-on-one settings to maximize learner's satisfaction and learning.

Keywords: Crowdsourcing, Vygotsky, Social Constructivism, More Knowledgeable Others, Zone of Proximal Development, Online Learning, Personalized Learning

Introduction

The ever-growing pace of digitization has entirely changed how businesses around the world communicate with its consumers and employees. Recent advances in web 2.0 technologies have made institutions to think about crowdsourcing as an attractive business model for today's world. Howe (2006) first coined the term crowdsourcing in his popular article "The rise of crowdsourcing". In its simplest form, it is defined as an open call to outsource a task to a crowd. At present, crowdsourcing can provide a promising solution for institutions across industries, who want to utilize the power of masses. Brabham (2008) defined crowdsourcing as an online, distributed model for problem solving and productions. Typically, crowdsourcing represents the function of a company, previously done by its employees, to be outsourced to a large network of people, referred as the crowd. As defined by Thuan and colleagues (2016), the crowd is a large undefined group of individuals that pulled the task to complete it. This is usually done in the form of an open call at various crowdsourcing platforms.

A number of researchers have contributed to discovering and understanding different aspects of crowdsourcing such as cost saving (Whitla, 2009), development of expertise, information, skills, and labor (Brabham, 2008; Vukovic & Bartolini, 2010), techniques to address quality of performance in crowdsourcing (Kittur et al., 2013) and theories such as crowd capital theory (Prpic et al., 2013).

There are various initiatives where crowdsourcing has been successfully implemented in education. Columbia University used crowdsourcing by allowing students to suggest ideas in the "What to Fix Columbia" community. The school implemented a feedback mechanism which made a significant difference in how students operate at the school (Columbia University Case Study, 2014). Another project called Crowdsourcing Girls' Education used a community-based approach to lower drop-out rates in secondary schools in Ethiopia and Tanzania (UNESCO Crowdsourcing for Education, 2012).

In recent times, an increasing interest can be seen in online education, evident by the success of communities like Khan Academy and online courses by Stanford. However, the idea of online education today primarily focuses on presenting large-scale online courses to masses that are impersonal in nature. Despite its popularity, the number of online education solutions is limited. Weld et al. (2012) argue that crowdsourcing is critical to the success of this area of education. As Weld and colleagues (2012) point out, crowdsourcing is not only required to solve problems of delivering large-scale virtual education, but online education is also a mostly unexplored way to create the crowd that can contribute in providing support to learners looking for help. There are ways where learners can help their peers in an online setting. On one level, they can help each other with assignments and answers to various problems. This is mostly achieved through online forums where help seeker can post questions or problem statements and someone more knowledgeable in that domain answers those questions. While on another level, crowdsourcing in education gives students a chance to participate in a group process where they are able to evaluate real-life problems and propose creative solutions.

We believe that crowdsourcing can also offer unlimited opportunities and a step forward towards personalized education. This includes forming the crowd around specific knowledge domains in an online setting to facilitate collaboration and utilizing the capabilities of more knowledgeable individuals in providing support to others. This study aims to re-think Vygotsky's conceptualization of social constructivism within learning communities, in order to focus on the collective wisdom, human computation, and capabilities of the crowd to enhance individual and collective learning.

Research Background

At present, most online courses are offering the same brick-and-mortar model which schools are practicing since ages: the same one-to-many interactions with non-interactive learning content. In contrast, we argue that online medium offers the potential for adaptive, one-to-one interaction with the opportunity of directly engaging learners. There is an ongoing tension between synchronous and asynchronous delivery of online courses. Coursera and Udacity have implemented the synchronous model in which a group of students progresses through the curriculum in lockstep (Koller 2012). This approach has some clear benefits. Shared deadlines result in improved motivation. The masses on the forums provide quick answers to the important questions. Stanford's 2011 online course of Machine Learning had an impressive median response time of 22 minutes for forum questions (Friedman 2012). In contrast, asynchronous delivery offers so much ease and freedom that synchronous delivery benefits seem to fade. Moreover, in these methods of delivery, how to provide an individual learner, the help s/he requires on a one-to-one basis, how to guarantee that the course outcomes have been achieved and how to enhance learning, are some of the questions that require immediate attention. Crowdsourcing seems to have the potential to answer these questions. The formation of the crowd in an online social setting around specific knowledge domains can provide ways to connect help-seeking learners to more knowledgeable peers in a one-on-one setting. Feedback provided on an individual level by the crowd can help to achieve the course outcomes positively, which ultimately results in enhanced learning. In addition to this, motivation plays an important role for crowd worker to participate in crowdsourcing task. Either they have to complete a task or to provide help to others. In crowdsourcing marketplaces, crowd workers are motivated extrinsically as well as intrinsically to perform tasks and they allocate their respective efforts to achieve their set goals (Rouse, 2010; Doan et al., 2011; Geiger et al., 2011; Kaufmann et al., 2011). Thus increased motivation levels result in increased effort.

Theoretical Foundations

To better understand the social constructivism, we studied the concepts rooted in the work of Russian psychologist Lev Vygotsky. According to him, knowledge gets constructed by exchanging dialogues and interacting with others in a social setting (Vygotsky 1978). It is worthwhile to understand the difference between knowledge and learning. The social constructivist theory stated that knowledge is co-constructed in the environment (interpsychologically) with others (Vygotsky 1978). Though

learning occurs through collaboration, it is still an internal mechanism within the individual (intrapsychologically). Individual learning is actually a product of knowledge creation, and this happens when collaboration takes place and knowledge itself gets co created in the environment. Moreover, Vygotsky also argued that individual level learning happens in the Zone of Proximal Development (ZPD) or the space where intellectual growth is still ongoing (Marsh and Ketterer, 2005). The ZPD may be said as the functions that are not learned till now. They can be seen as the florets of development, not the yield of development (Marsh and Ketterer, 2005; Vygotsky, 1978). Yield of development can be regarded as knowledge already acquired by now that resides in the Zone of Actual Development (ZAD). Vygotsky argues that learning is actually an expansion of ZPD into ZAD.

Another concept worthwhile to discuss here is the concept of More Knowledgeable Others (MKO's). According to James V. Wertsch (1991), individual development which also includes higher level mental functions originates from social sources and social interactions. MKO refers to peers or someone who is more capable than the one involved in learning, possesses higher cognitive capabilities in comparison with the one seeking help. In a social setting, MKO can be student, teacher or program/software with enhanced capabilities and a better understanding of the context.

Personalized learning, in its basic form, can be defined as teaching each student according to their abilities, their varying level of interest, differing motivations and preferred learning styles. The goal of the personalized learning is to tailor learning experiences according to their individual and time-varying needs. A key challenge central to personalized learning is how to collect a set of learning resources efficiently to suit individual needs. Also, literature on crowdsourcing reveals several types of crowdsourcing. Recently, at the broader level, Prpic and colleagues (2015) identified two types of crowdsourcing, *Content-based crowdsourcing* and *Contribution-based crowdsourcing*.

This work tries to explore an approach to effectively connect learners to other MKO's based on crowdsourcing. We will also explore how crowds can be formed around specific knowledge domains, thus to facilitate the creation of ZPD between learners and MKO's. This will create knowledge which in turns guarantees learning at an actual development level according to Vygotsky. Crowdsourcing can offer the needy students a way to get connected with MKO's, discussing their topic at hand, resolving their problems, thus develop a better understanding of the subject and/or topic.

Research Questions

This research will answer the following questions and try to fill the gray area that exists within asynchronous online courses.

RQ1. *Can crowdsourcing facilitate social constructivism, that is, the formation of ZPD between learner and MKO, in asynchronous online learning?*

RQ2. *To what extent social scaffolding enhance the learner's engagement, motivation, and retention in asynchronous online learning?*

RQ3. *What kind of motivation (extrinsic or intrinsic) is more attractive for a crowd, enabling them to act as MKO's in asynchronous online learning?*

RQ4. *How to measure the capability of a crowd worker around specific knowledge domains for online courses?*

RQ5. *How to construct a shared content-based artifact around specific online courses?*

RQ6. *What needs to be considered when recommending an MKO to a learner?*

The answer to these questions will definitely help the educators and course content providers to identify ways to keep learners more engaged and motivated, enabling them to complete the online courses, delivered asynchronously.

Research Method

To get answers to the questions identified in the previous section, we are planning an experiment. For a specific online course offered to masses, the crowd will be reached at Amazon Mechanical Turk (AMT), asking them to provide help in two broad areas.

1. To help learners acting as MKO and get connected to them in a one-on-one setting at learning platform the course is offered at.
2. To share their resources they have for the same domain of knowledge as the course.

As part of this experiment, we will carefully examine various online learning platforms and select the one which offers web 2.0 communications and collaboration technologies along with content sharing facilities. We intend to test the following hypotheses:

H1: Crowdsourcing has the potential to provide MKO's around specific online courses.

H2(a): MKO assisted learning is positively associated with enhanced learner's engagement in asynchronous online learning.

H2(b): MKO assisted learning is positively associated with enhanced learner's motivation in asynchronous online learning.

H2(c): MKO assisted learning is positively associated with enhanced learner's retention in asynchronous online learning.

H3(a): Intrinsic motivation enables crowd worker to act as an MKO in asynchronous online learning.

H3(b): Extrinsic motivation enables crowd worker to act as an MKO in asynchronous online learning.

H4(a): Recommender system based approach to evaluate MKO is positively associated with capable crowd generation around an online course.

H4(b): MKO's previous level of knowledge is positively associated with capable crowd generation around an online course.

H5(a): Learner perceives video conferencing as the most effective method of collaboration.

H5(b): Learner perceives audio calls as the most effective method of collaboration.

H5(c): Learner perceives discussion boards as the most effective method of collaboration.

H6(a): Supplementary course content within learning platform enhances intersubjective learning.

H6(b): Supplementary course content outside of learning platform enhances intersubjective learning.

Conclusion

The latest advancement of web 2.0 and the development of crowdsourcing techniques have enabled online course providers to think crowdsourcing as a way to collect different types of educational resources for various online courses so that learner can choose according to his individual preferences and specific needs. Also, the social constructivism theories, rooted in the work of Vygotsky, define ways to generate knowledge at the interpyshological level and then translate this knowledge into learning at intrapsychological level. The concept of MKO is also discussed here, focusing on how it can be used in online setting to maximize learning. Crowdsourcing seems to provide one-on-one interaction between MKO and learner, which is a way to maximize learning for online courses. The findings of this research will enable online course content creators, learning environment designers, and course providers to rethink their strategies in light of widely accepted social constructivist approach.

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