



A REVIEW OF THE USES OF CROWDSOURCING IN HIGHER EDUCATION

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ABSTRACT

Teaching, learning, and research in higher education institutions nowadays do not stop at the boundaries of campus and classroom any more due to the emergence of Web 2.0 technologies that facilitates social online interactivity and collaboration between people around the world. This paper explores at how crowdsourcing, one of the key elements in Web 2.0, has been practiced at the present time in various activities of higher education institutions through several projects that can be categorized into four primary strategies of crowdsourcing: crowd wisdom, crowd creation, crowd funding, and crowd voting. Uses of crowdsourcing can keep higher education institutions forefront of education and research innovation, and prepare members in these institutions including students, staff, researchers, lecturers and administration for the online world challenges.

Keywords: Crowdsourcing, Higher education, Crowd wisdom, Crowd creation, Crowd funding, crowd voting.

1. INTRODUCTION

Teaching and learning has significantly evolved over the past decade due to the emergence of Web 2.0. Most people agree that Web 2.0 facilitates social online interactivity and collaboration between people. Blogging, microblogging, crowdsourcing, mash-ups, real-time data feeds, and user-generated contents are just a few key elements of Web 2.0. This is distinct from Web 1.0 which was a static information dump where people read websites but rarely interacted with them. When you think of Facebook, Flickr, Google Maps, Twitter, Wikipedia and Google AdSense, you think of Web 2.0, while when you think of Britannica online, personal websites and content management systems, you think of Web 1.0.

The term 'crowdsourcing' was first coined by Howe (2006). It is a distributed problem-solving and production process that involves the act of outsourcing tasks to an undefined, large group of people or community i.e. the crowd, through an open call (Li & Hongjuan, 2011). To some degree, Howe was inspired by Surowiecki (2004) who through an extensive research discovered that "under the right circumstances, groups are remarkably intelligent, and are often smarter than the smartest people in them", which is termed as the "wisdom of crowds". Crowdsourcing has been so well adopted and utilized by the global community as it allows difficult and time-consuming projects to be tackled a bit at a time, and by a large group of individuals, working asynchronously and at their own pace.

Motivations to participate in a crowdsourcing exercise vary. More often than not, the strongest motivation is monetary reward, as discovered by Brabham (2010). As a result, crowdsourcing has been successfully applied in business or other profit making sectors such as Threadless, InnoCentive, Google MapMaker, Building Maker, and iStockphoto. Nevertheless, the practices of crowdsourcing in other domains have been explored too. These include cooperative traffic (e.g., Google Map and Waze), geo-social networking (e.g. Google Latitude and Loopt), product testing (e.g., uTest), user-generated content (e.g., Youtube), user optimization experience (e.g., Google personalized search), and leveraging mass reach (e.g., Google SMS Trader). This article explores at how crowdsourcing has been practiced at the present time in various activities of higher education institutions, especially those that require time, energy, and tremendous resources. It begins with an introduction of four primary strategies of crowdsourcing. This is followed by elaboration of each strategy via examples of crowdsourcing projects in universities and colleges around the world found in the literature.

2. EDUCATIONAL ACTIVITIES AND CROWDSOURCING

Crowdsourcing can be used in many activities in higher education institutions, which can be mapped into four primary strategies of crowdsourcing, as discussed in Howe (2008). Although Skaržauskaitė(2012) has introduced several other additional strategies such as *crowd democracy*, and *crowd reviews*, they lack clarity and thus will not be used explicitly in this article. The four primary crowdsourcing strategies are known as:

1. *Collective intelligence or crowd wisdom*: Crowd wisdom involves sharing of knowledge and gathering ideas from the crowd to solve problems, or predict future outcomes or help direct university's corporate strategy. In higher education institutions, for example Universities, this activity may include crowdsourcing projects to solicit marketing ideas for newly invented product and ideas for achieving continual improvement to increase academic standards. Additionally, universities also engage crowdsourcers in gathering possible strategic initiatives from students, staff and community to achieve the university's objectives.
2. *Crowd creation*: This type of crowdsourcing happens when crowdsourcers are utilized to create or co-create a product or service. List of projects for this type of crowdsourcing in education is almost endless. Examples of crowd creation projects include those where researchers turn to the public to create a database of online historical exhibits, bibliographic data, linguistics, biology as well as image tagging. There are also researchers who rely on the public to create online textbooks and other class content and materials. In addition, some researchers introduced projects that provide on-campus supports by the crowds, so that the operating cost of hiring permanent support staff is reduced.
3. *Crowd funding*: In education, this refers to the effort of people who network and pool their money through small contributions from many parties, usually via the Internet, to support much-needed funding for education projects. The type of education projects appropriate for crowd funding is very broad and this includes finding ways to finance student education and fund student scholarship. One of the newest trends in crowd funding is raising money for academic research pursuits.
4. *Crowd voting*: This refers to any means of getting the opinion, ideas and decision of the public by way of voting. Universities and colleges are seen to have used crowd voting for their competition-based initiatives, mostly with the intention to empower students in making decisions.

2.1. Crowd Wisdom Projects

This type of crowdsourcing is simply about sharing knowledge and gathering ideas from the crowd to solve problems, or predict future outcomes or help direct university's corporate strategy. It can be seen in the literature that Universities researchers have crowdsource part of their research. With crowdsourcing projects, colleges and universities can use collective brain power and energy

to complete what they can't do on their own, going beyond their budgets and time constraints. These projects came from various domains such as biology, digital humanities, linguistic, spatial science, historical exhibits, and geospatial. Although it appears that the website is the most commonly used crowdsourcing tool, and others such as open source games, Facebook pages, text messages and voicemails have been explored too in some of these projects. One example of the crowd wisdom project in higher education institutions is the *Strategic Planning at CSUF*. In this project, students, faculty and staff members of California State University Fullerton, USA (CSUF) were invited to suggest possible strategic initiatives to achieve university's goals and initiatives that result in project that match the strength and opportunities of the university (CSUFNews, 2010).

In another project, the *Global Voices for Maternal Health*, hosted by Oxford University's Nuffield Department of Obstetrics and Gynaecology, gets global contributions of knowledge for delivering safe, effective medical care to women and children (Chaordix, 2010). The project gives 2,303 maternal healthcare providers from 99 countries including doctors, nurses and midwives their voices in how best to provide care to pregnant women in Africa, Asia, Latin America and the Middle East. It enables people on the maternal healthcare frontlines to discuss the problems faced, and identify healthcare solutions to decrease the number of women dying unnecessarily in childbirth every year. There are several other examples of crowd creation projects in higher education including the *Great Sunflower Project* (Laster, 2010), *Ichthyological survey of Guyana's Cuyuni River* (ScienceDaily, 2011), *KML datasets* (Geens, 2008), and many others.

2.2. Crowd Creation Projects

This type of crowdsourcing happens when crowdsourcers are utilized to create or co-create a product or service. With crowdsourcing projects, universities and colleges around the world create a service at a much lower cost. We have seen several crowdsourcing projects for creating almost any product for specific use of students and researchers in universities but also for public use. Under a project called *The Great War Archives*, the Oxford University, UK creates an archive that contains 6,500 digitized images of items contributed by the general public in 2008, via a website and a series of open days at libraries and museums throughout the UK (CSUFNews, 2010). In another project called the *Billboard Map*, PhD candidate, Elisabeth Sedano, from University of Southern California, USA developed a Website that uses crowdsourcing to tracks and maps the visual eyesores in hopes of creating database of billboard locations in the LA area. In the *Metadata Games* project (Howard, 2011), designers in University of Munich, Germany were experimenting to make crowdsourcing photo tags fun by creating games that make the process an interesting and sometimes collaboratively challenging. In another example, via the *Metropolitania* project (Kneissl&Bry, 2012), University of Munich, Germany creates a platform for linguistic field research to encourage people to participate in the process of gathering a big Italian linguistic dataset from a wide geographic area with low effort.

Crowdsourcing can also be used to create crowdsourced textbook and other course or class materials. Table 1 summarizes among the crowdsourcing projects for creating crowdsourced content. The *Online Textbook* project conducted in Brigham Young University, USA involved over 682 students of Project Management class created an electronic book title *Project Management for Instructional Designers* (Wiley, 2011). One example of a crowdsourcing project for creating a text book is the *Management Through Collaboration Book* project. This project led by professor Charles Wankel from St. John's University is possibly the largest ever collaborative publishing project, the book has around 1,000 co-authors from roughly 90 countries, including Iceland, The Netherlands, Grenada, Saudi Arabia, Fiji, Sweden, Italy, Romania, UK, Vietnam and the USA (Wankel, 2009). Participation of the crowdsourcers ranges from input to a chapter, along with many other authors, to leading a chapter or coordinating a key function such as video interviews. In a different project called *The SOS Classroom*, students from the University of Southern California, USA used crowdsourcing to prepare course materials for K-8 such ESL (English as a second language), language arts, math, music, and science.

We have also seen crowdsourcing projects in higher education institutions that create or co-create a service to support students and the public. For example, the Indiana University at

Bloomington, USA through its project called the *Tech Support* provides a help desk service by letting computer users to answer one another's questions as a way to reduce cost of its 24-hour tech-support help desk. In 2008 the help desk handled more than 150,000 inquiries, which cost the institution about \$11.41 per phone call and \$9.39 per e-mail message (Young, 2009). In another example, through *Tiramisu* project, researchers at Carnegie Mellon University, USA created an iPhone App that predicts when a bus will arrive in real-time. Signals from the application of existing bus riders will indicate location, and the number of signals indicates fullness. It is available free through the iTunes AppStore.

Table 1: Summary of crowdsourcing projects for creation of crowdsourced content

| Project Name | Institution | Volunteers | Project | Source |
|---|--|--|---|---|
| Online Textbook | Brigham Young University, USA | 682 students of Project Management class | Textbook – Project Management for Instructional Designers | (Wiley, 2011) |
| Crowdsourcing Textbooks | North Carolina State University, USA | 120 students | Textbooks - Object Oriented Design, Architecture of Parallel Computers | (Gehring, 2011) |
| Management Through Collaboration Book Project | St John's University, USA | Almost 1000 management educators and researchers in about 90 nations | Textbook – Management through Collaboration: Teaming in a Networked World | (Wankel, 2009) |
| The SOS Classroom | University of Southern California, USA | Teachers, parents, and students | Course materials for K-8 students – ESL (English as a second language), language arts, math, music, and science | http://sosclassroom.org |

Another trend of crowd creation project in higher education is student-generated guide to colleges and universities through reviews by the crowd. An example of such project is called *Unigo*, a student-generated guide to North American colleges for prospective applicants and their families (Dee, 2008). At the beginning of the project, only 267 colleges were featured. Up until 2008, it has received more than 30,000 individual bits of content — primarily reviews in the form of responses to an essay-based questionnaire, but also photos, videos, uploaded writing samples, etc (Young, 2009). To date, it hosts up to 100,000 free college reviews and millions of students are estimated to have used *Unigo* to assist in their college search.

3. CROWD FUNDING PROJECTS

Crowd funding is an excellent resource for securing much-needed funding for educational projects. The types of education projects appropriate for crowd funding are very broad. These include finding ways to finance students education, fund student scholarship, raising funds for a computer lab, funding new athletic team uniforms, support for marching bands, educational outreach projects (such as field trips), support for school library (such as new books and staffing), funding for educational events (such as science fairs, spelling bees, robotics competitions), support for exchange programs for students, summer internships, and facilities upkeep and maintenance (such as graffiti removal).

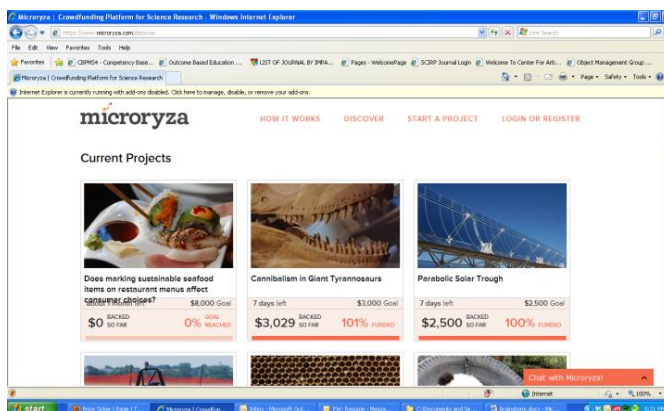
One example of an online crowd funding project is *Takeashine* that provides a platform for underprivileged students to raise fund to meet their higher education costs. Underprivileged, but well-performing students often have high hopes of going to college, but have trouble actually affording the cost of a higher education. Along with the new social crowd funding resource *Start*

Some Good, Take a shine helps these students get donations for college through crowd funding (Pitts, 2013). But beyond financial contributions, *Take a shine* also allows students to get a clear financial picture of what college will cost, with a model for *Individual Estimated Family Contribution* that shows the difference between estimated and actual college costs. A notable thing about this platform is that students do not have to pay back the money raised, only provide tokens of appreciation to thank donors.

Another crowd funding project is called *Education Generation* (<http://educationgeneration.org/>), a portal launched by a Vancouver-based organization in 2011 to raise money for student scholarships. *Education Generation* allows donors to search for students by country, educational partner, or gender; receive photo and written updates from funded students throughout their academic lives; purchase gift cards to fund a student; share individual student profiles over social media; and log in via Facebook. It has over 600 active donor members from more than 20 countries and a network of educational partners in ten countries including Afghanistan, Ecuador, Ghana, Kenya, India, Pakistan, Peru, Rwanda, Sri Lanka and Uganda.

One of the newest trends in crowd funding is raising money for academic research pursuits. A new portal launched in April of 2012 called *Microryza* does just this, which is accessible from <https://www.microryza.com/>. It was founded in 2012 by Denny Luan and Cindy Wu, former University of Washington researchers, and Robert Farrington. A screen capture of the portal is shown in Figure 1. *Microryza* is a full platform that allows researchers to post their research projects so that they can share it with the world to solicit donations. Once the research projects reach their donation target, the funds are collected and released to the researcher. At the end of the research, researchers are required to share their research results and use rich multimedia to bring the public into their lab.

Figure-1. Screen capture of Microryza

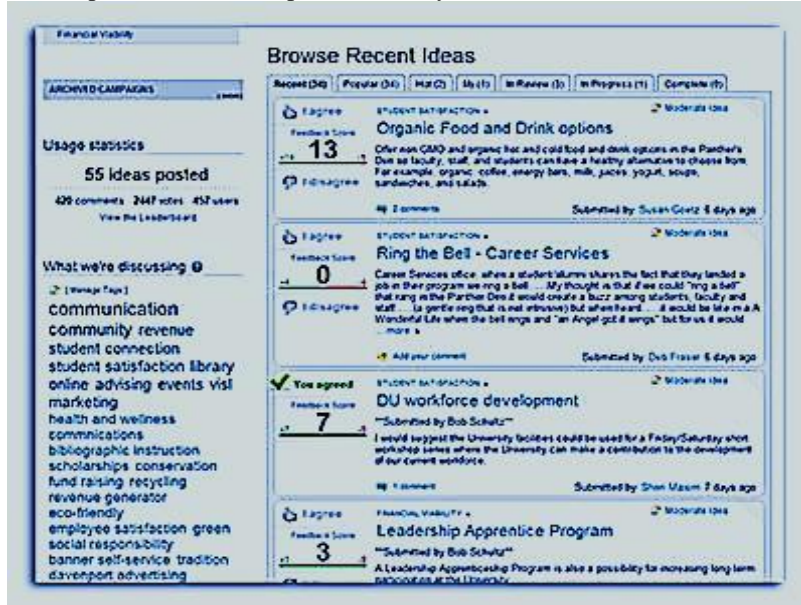


4. CROWD VOTING PROJECTS

Crowd voting occurs when a crowdsourcing platform such as website gathers a large group of opinion and judgment on a certain topic. In education, this strategy can be used for innovation because it can play a key role in getting the whole organizational body co-working together on competition-initiatives of the institution as well as for problem solving. The first example of how crowd voting can be used in higher education is the *Innovation Station* by Davenport University, USA. The university has pursued a “quality journey”, called *Vision 2015*, to increase its academic standards to measure by how well students do in the classroom, how timely they are in completing their degrees, and how effective its alumni are in finding jobs in their chosen career paths. And the institution wants to be known as an innovative school. Davenport uses the project to allow faculty, staff and students ideas to be vetted by the campus community for achieving continual improvement to increase its academic standards and achieve organizational change (Schaffhauser, 2013). A screen capture of the project is shown in Figure 2. This project goes beyond crowd voting

as it ultimately is attempting to change Davenport's culture from a traditionally siloed organization one that's more collaborative across departments and divisions.

Figure- 2. Screen capture of the Davenport University Innovation Station (Schaffhauser, 2013)



In another example, in 2012, Utah Valley University (USA) created a new digital media contest that relies on the wisdom of the crowd to pick the winners (Stewart, 2012). In this contest, Utah-based digital media companies have submitted new technologies and the winners are those that generate the most online votes. The voting lasted for 30 days. The new technologies that were applicable to the contest include mobile and web applications, video games, film, 3D animation, special effects and digital audio. This contest attracted participation by giving its winners, those technologies with the highest votes, cash prizes.

5. CONCLUSIONS

Uses of crowdsourcing can keep higher education institutions forefront of education and research innovation, and prepare members in these institutions including students, staff, researchers, lecturers and administration for the online world challenges. Crowdsourcing can also be used to solicit ideas, reviews, and feedback, and to create on-campus support from the crowds. In addition, crowdsourcing can be used to stimulate better communication between students, lecturers, administration, and beyond the campus i.e., the public. Researchers and libraries are seen to have used crowdsourcing mostly for data collection and analytic. Lecturers and students seem to have practiced crowdsourcing for creation of crowd sourced content on almost any topic or domain, which include creation of textbooks, and other class materials. Crowd funding is also an excellent resource for securing much-needed funding for education and educational projects. In addition, crowdsourcing can be used to gather a large group of opinion and judgment on a certain topic. In this paper, the uses of crowdsourcing for supporting educational activities are classified following the four primary strategies of crowdsourcing introduced by Howe (2008), which include crowd wisdom, crowd creation, crowd funding, and crowd voting.

REFERENCES

- Brabham, D. C. 2010. Moving the crowd at Threadless. *Information, Communication & Society*, 13(8): 1122-1145.
- Chaordix. 2010. Canadian Crowdsourcing Company Chaordix® Joins Oxford University to Advance Maternal Health Retrieved Feb 14, 2013, from <http://www.chaordix.com/news/canadian-crowdsourcing-company-chaordix-joins-oxford-university-advance-maternal-health/>
- CSUFNews. 2010. Crowdsourcing the University's Future, Call for Strategic Initiatives from Students, Faculty and Staff. Retrieved Feb 2, 2013, from <http://calstate.fullerton.edu/news/2010/crowdsourcing-strategy.asp>
- Dee, J. 2008. The Tell-All Campus Tour. *The TIMES Magazine*, from http://www.nytimes.com/2008/09/21/magazine/21unigo-t.html?em&_r=0
- Geens, S. 2008. King's College London starts KML crowdsourcing projects Retrieved Feb 3, 2013, from <http://oglearth.com/2008/02/kings-college-london-starts-kml-crowdsourcing-projects/>
- Howard, J. 2011. Gaming the Archives Retrieved Feb 2, 2013, from <http://chronicle.com/blogs/wiredcampus/gaming-the-archives/31435>
- Howe, J. 2006. The rise of crowdsourcing. *Wired magazine*, 14(6): 1-4.
- Howe, J. 2008. *Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business*: Crown Publishing Group.
- Kneissl, F. and Bry, F. 2012. METROPOLITALIA: A Crowdsourcing Platform for Linguistic Field Research. Retrieved from <http://www.pms.ifi.lmu.de/publikationen/PMS-FB/PMS-FB-2012-14/PMS-FB-2012-14-paper.pdf>
- Laster, J. 2010. A Swarm of Volunteers, a Honey of an Idea. *The Chronicle of Higher Education* Retrieved March 7, 2013, from <http://chronicle.com/article/Crowdsourcing-a-Honey-of-an/65705/>
- Li, Z. and Hongjuan, Z. 2011. Research of crowdsourcing model based on case study. Paper presented at the Service Systems and Service Management (ICSSSM), 2011 8th International Conference.
- Pitts, J. B. 2013. Takeashine Helps Students Crowdfund for College Retrieved Jan 17, 2013, from <http://dailycrowdsource.com/crowdsourcing/company-reviews/442-takeashine-helps-students-crowdfund-for-college>
- Schaffhauser, D. 2013. Crowdsourcing Innovation on Campus Retrieved March 2, 2013, from <http://campustechnology.com/articles/2013/02/07/crowdsourcing-innovation-on-campus.aspx>
- ScienceDaily. 2011. Crowdsourcing Science: Researcher Uses Facebook to Identify Thousands of Fish, from <http://www.sciencedaily.com/releases/2011/05/110513204526.htm>
- Skaržauskaitė, M. 2012. The Application of Crowd Sourcing in Educational Activities. *Social Technologies*, 2: 67-76.
- Stewart, H. 2012. Crowd to Choose Media Contest Winners Retrieved March 3, 2013, from http://dev.utahbusiness.com/articles/view/crowd_to_choose_digital_media_winners
- Surowiecki, J. 2004. *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations*.
- Wankel, C. 2009. *Management Through Collaboration Book Project* Retrieved Jan 22, 2013, from <http://www.project.globally-collaborating.com/about/>

- Wiley, D. 2011. Project Management for Instructional Designers. Iterating Towards Openess Retrieved Jan 10, 2013, from <http://opencontent.org/blog/archives/2119>
- Young, J. R. 2009. Colleges Try Crowdsourcing Help Desks to Saves Money. Technology Retrieved Feb 20, 2013, from <http://chronicle.com/article/Colleges-to-Try/48982/>