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Incentives and Disincentives for the Use of OpenCourseWare

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Abstract

This article examines Utah residents' views of incentives and disincentives for the use of OpenCourseWare (OCW), and how they fit into the theoretical framework of perceived innovation attributes established by Rogers (1983). Rogers identified five categories of perceived innovation attributes: relative advantage, compatibility, complexity, trialability, and observability. A survey instrument was developed using attributes that emerged from a Delphi technique with input from experts in the OCW field. The survey instrument was sent to 753 random individuals between 18 and 64 years of age throughout Utah.

Results indicated that the greatest incentives for OCW use were the following: (a) *no cost for materials*, (b) *resources available at any time*, (c) *pursuing in depth a topic that interests me*, (d) *learning for personal knowledge or enjoyment*, and (e) *materials in an OCW are fairly easy to access and find*. The greatest disincentives for OCW use were the following: a) *no certificate or degree awarded*, (b) *does not cover my topic of interest in the depth I desire*, (c) *lack of professional support provided by subject tutors or experts*, (d) *lack of guidance provided by support specialists*, and (e) *feeling that the material is overwhelming*. The authors recommend that institutions work to transition some OCW users into degree-granting paid programs as well as adopt a marketing campaign to increase awareness of OCW. Additionally, OCW websites should make their content available to recommendation engines such as ccLearn DiscoverEd, OCW Finder, or OER Recommender and should link to one or more of these sites.

Keywords: OpenCourseWare; open educational resources

Background to the Study

OpenCourseware (OCW) is dedicated to the development of freely available, stand-alone online courses and teaching materials informed by the best current research. OCW includes items such as lecture notes, reading lists, course assignments, syllabi, study materials, tests, samples, simulations, and the like (Educause Learning, 2006). Institutions of higher learning involved in OCW initiatives in the United States include founder Massachusetts Institute of Technology,

Johns Hopkins Bloomberg School of Public Health, and Carnegie Mellon, among many others. There is also a strong international presence with institutions participating in many regions, including Brazil, Columbia, Japan, Korea, Saudi Arabia, Spain, Taiwan, United Kingdom, and Venezuela, to name a few (OCW Consortium, 2009; Caswell, Henson, Jensen, & Wiley, 2008). An OCW consortium can be found at <http://www.ocwconsortium.org/> and has been formed to develop a shared mission, goals, priorities, visibility, and searchability. Yet, although OpenCourseware is gaining momentum, there remain questions about its reach and effectiveness globally, nationally, and locally.

The questions are with regard to identifying incentives – those aspects that would be attractive to potential users of OCW, as well as disincentives – those aspects acting as perceived barriers to OCW use. For the creators of OCW materials, a well-developed understanding of incentives and disincentives for OCW use would indicate design imperatives that increase access and usability of the resources aimed directly at the public they are intended to serve. So far, most of the OCW resources are found and used by individuals who are seeking them. But what about those who do not know the resources exist?

This article examines Utah residents' views of incentives and disincentives for the use of OpenCourseWare (OCW), and how they fit into the theoretical framework of perceived innovation attributes established by Rogers (1983). Rogers was chosen due to his prominence in the field, his use in prior doctorate work (Allard, 2003; Al-Shohaib, 2005; Liebermann, 2006; Schroll, 2007), and his demonstration that between 49% and 87% of variance in the rate of adoption of innovations can be attributed to the following five perceived innovation attributes: (a) *relative advantage*, (b) *compatibility*, (c) *complexity*, (d) *trialability*, and (e) *observability*. Research by Rogers has been used to successfully assess information technology and technology communication (Al-Gahtani, 2003; Dayton, 2004) as well as other areas, including health services and social services. Tornatzky and Klein, for example, did a meta-analysis of 75 articles concerned with innovation characteristics and their relationship to innovation adoption and implementation (1982).

The following research questions will be answered in this paper:

- (a) What perceived incentives contribute to the use of OCW by the Utah adult population?
- (b) What perceived disincentives prevent the use of OCW by the Utah adult population?
- (c) What diffusion attributes contribute to the adoption (incentives) of OCW in Utah?
- (d) What diffusion attributes contribute to the rejection (disincentives) of OCW in Utah?

A survey instrument was developed using attributes that emerged from a Delphi technique with input from experts in the OCW field. Eleven experts were asked to participate and five were actively involved. After the attributes were identified, they were placed into the attribute characteristics established by Rogers. It was then pilot-tested with 40 individuals. Cronbach's alpha was calculated to assess inter-item consistency for the $N = 44$ pilot test and required a reliability of .70 or higher before the survey instrument would be used (Schumacker, 2005). The

survey instrument was sent to 753 random individuals between 18 and 64 years of age throughout Utah.

For this study, it is assumed that a primary concern is to understand incentives and disincentives for OCW adoption and use by the general public. Therefore, this study surveyed individuals throughout Utah, without focusing on a particular audience subset. Equally, it is assumed that concern exists regarding overall incentive or disincentive for use and adoption of all available OCW and open educational resource materials, not simply those offered from within Utah state boundaries. Therefore, the research will consider participants' interests in OCW and open educational resource materials to be relevant to a broader population.

Literature Review

MIT has perhaps the most well-known OCW project (see <http://OCW.mit.edu/>). The institution began publication of its courseware for public consumption in 2002 and has made content from its approximately 1800 courses available on the Internet at no cost for noncommercial purposes (Carson, 2006; Matkin, 2005), offering materials such as class notes, syllabi, assignments, problem sets, reading lists, and presentations (Lerman & Miyagawa, 2002; Olsen, 2002; Vest, 2004; Young, 2001). It has published all of its courses from all five of its schools and from 33 academic departments (Smith & Casserly, 2006; Vest, 2006). Its website is visited over 1.2 million times per month from individuals around the globe with the help of nearly 80 mirror sites on university campuses around the world, including 54 in Africa and 10 in East Asia. MIT OCW is primarily in English but has been translated into other languages, including Spanish, Portuguese, traditional Chinese, and simplified Chinese (Kirkpatrick, 2006; Smith & Casserly, 2006; Vest, 2006). Certainly, while MIT remains at the forefront of developing and delivering OCW, the number of institutions participating in OCW projects is expanding. There are more than 200 higher education institutions and associated organizations from around the world creating a broad and deep body of open educational content using a shared model. Examples include China Open Resources for Education, which incorporates 30 institutions in China, Japan OCW Consortium, which incorporates nine institutions, and Spain and Portugal's OCW Universia, which incorporates 14 institutions (OCW Consortium, 2009). Understanding more about the communities who have the potential to use these resources is increasingly important.

Incentives for Producing and Using OpenCourseWare

Research has reported why educators, both individuals and institutions, may or may not opt to use or to develop OCW materials (Downes, 2007; Moore, 2002; Smith & Casserly, 2006). Researchers have also identified, to some degree, an understanding of who is using OCW materials and why (Carson, 2006; Hanselman, 2009). There has also been speculation regarding why students might opt to use OCW materials (Smith & Casserly, 2006). However, research has not investigated what potential users see as incentives or disincentives for using OCW. Little is known in a formal adoption model, such as the attributes of innovation established by Rogers, about what incentives support adoption.

The Centre for Educational Research and Innovation, which is a part of the Organization for Economic Cooperation and Development, has attempted to identify some basic drivers of open educational resource usage and development for all constituents, including government, educational institutions, and individuals. These include technical, economic, social, and legal drivers. It has also worked to identify the motives of individual instructors and researchers to share learning resources. The Centre identified four main groups of reasons: (a) altruism or community support, (b) personal nonmonetary gain, (c) commerce, and (d) convenience because it is not worth the effort to keep the resource closed (Trenin, 2007). However, this research only minimally addressed the consumer standpoint. Instead, the focus was on contributors or original creators of content.

Open educational resources are anticipated to have different benefits based on different audiences. From the perspective of educational networks and institutions, open educational resources can offer the means for a long-term conceptual framework focusing on reusability. They can also potentially allow a higher return on the investment of tax dollars and enrich the size and quality of the pool of resources. From a teacher's or a student's perspective, open educational resources can offer access to a broad range of subjects, which permits flexibility in topics and reuse of the resources, encourages improvements, builds or strengthens learning communities, and promotes user-centered approaches (Open eLearning, 2007).

Barriers to Producing and Using OpenCourseWare Resources

Just as the above-cited uses of open educational resources can be categorized as technical, economic, social, and legal in nature, the same can be said of barriers for use and production. The Centre for Educational Research and Innovation has attempted to identify and describe these basic barriers for open educational resource usage. Technical barriers are issues such as lack of Internet access or other necessary technical resources. Economic barriers are issues such as limited funds to invest in hardware or software, or difficulties covering developmental costs. Social barriers include undeveloped or underdeveloped skills to use the technical resources available, resources that end up being context bound, and social norms and traditions that encourage or discourage engagement with different groups. Legal barriers include copyright prohibitions, as well as a lack of clear policies or procedures (Trenin, 2007).

Perhaps the most important means for accessing open educational resources is to have access to the Internet. Without the Internet, it is necessary to obtain the resources from others through reuse in printed copies or in localized digital copies. Based on MIT's OCW data from 2005, OCW materials are indeed being widely distributed offline to secondary audiences: "18% of visitors distribute copies of OCW material to others; 46% of educators reuse content; of those, 30% give students printed copies, and 24% provide digital copies" (Carson, 2006, p. 2). These technical barriers may exist in the immediate term or in the longer term in regard to sustainability (Caswell et al., 2008; Downes, 2007). Economic barriers such as cost and sustainability are factors to be considered in any open educational resources project since the production, maintenance, and distribution of materials on the Web have very real costs associated with them (Downes, 2007; Vest, 2006). The Open Content Alliance, for example, which is digitizing

released-from-copyright materials for public use, is doing it at a cost of 10 cents a page. While this seems to be a reasonable price, it is a price just the same (Tennant & Tennant, 2005; Young, 2006). A social barrier arises if potential participants are not able to locate or use the resources available, in which case the resources will serve little if any direct purpose.

A significant legal barrier in offering open educational resources is that of copyright and intellectual property (Vest, 2006). In sharing educational materials there are copyright issues to consider, particularly if the instructor is not the originator of all of the materials used. Much of the cost related to offering an OCW site has to do with assuring that copyright and intellectual property clearances have been addressed and approvals granted (Atkins et al., 2007; Smith & Casserly, 2006). In some cases, it may not even be clear if the content is considered the property of the institution, the instructor, the student, or another originator (Fitzgerald, 2007). Therefore, tools that release or selectively release copyright are gaining a foothold. One example of this is the Creative Commons; another example is Australia's AShareNet licensing system. As Vest (2006) noted, quality control could be a content barrier for open educational resources, particularly since there are no formal peer reviews or publisher certifications in many instances. However, it could also be argued that there is even more opportunity for quality control due to feedback and improvements by communities and networks who share the content (Open eLearning, 2007).

Rogers's Attributes of Innovation

Getting new ideas, technologies, products, or processes adopted on a wide scale is difficult. Rogers (2003) discussed the challenges and end-user tendencies in adopting new innovations. Rogers defined an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 12). In the case of OpenCourseWare, the practice of offering traditionally private educational materials openly to the public is new, particularly when offering full course materials. Equally, OpenCourseWare materials may be perceived as a new method of learning, particularly for self-directed learners.

According to Rogers, users who may adopt an innovation consider definable attributes when making their decision. These include (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability. Relative advantage is "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2003, p. 229). An individual's assessment of relative advantage could include many aspects, such as social prestige, convenience, satisfaction, or economic improvement (Allard, 2003). Compatibility is "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 2003, p. 240). If the innovation is a logical extension of the environment or it matches existing values or experiences, it is likely to be adopted more readily (Allard, 2003). Complexity is "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 2003, p. 16). Those that are easier to understand and that do not require attainment of new skills will be more readily adopted. Trialability is "the degree to which an innovation may be experimented with on a limited basis" (Rogers, p. 257). New ideas that can be used on a trial basis are generally more accepted and adopted partly

because they help dispel uncertainty (Rogers, p. 258). Observability is “the degree to which the results of an innovation are visible to others” (Rogers, p. 258). Innovations that are more visible and observable are likely to have greater acceptance and adoption. These attributes offer a natural alignment to questions regarding incentives and disincentives to adopt OpenCourseWare.

Methods

The state of Utah has been chosen as the sample for this study because the Utah Legislature provided \$200,000 to Utah State University for OCW-related activities in the 2007-2008 budget year (Utah System of Higher Education, 2007). This implies that OCW is seen as relevant and impactful by the Utah System of Higher Education and the Utah state government.

Data Collection

The survey was sent via postal mail to a randomized group of 753 residents of Utah between the ages of 18 and 64. The names and addresses, along with information about gender, ethnicity, income, age, education, and occupation, were obtained from Alesco Data Group, LLC of Fort Myers, Florida. The demographic information used for this study includes (a) gender, (b) age, (c) education, (d) income, (e) occupation, and (f) ethnicity.

The survey package included (a) a cover letter describing the importance of the participant, incentives offered, purpose of the study, assurances of confidentiality, and completion time; (b) a statement of consent; (c) the survey with a unique identification number that tied the survey results back to the demographic variables (see Appendix), and (d) a pre-paid addressed envelope for return of the survey.

The first follow-up letter was mailed two weeks after the study introduction. The purpose of this letter was to thank those who had already completed and returned their survey package and to remind those who had not yet done so. Second and third follow-up letters were mailed to non-respondents in the third and fourth weeks after the study introduction. In the last follow-up letter, instructions were included for requesting another copy of the survey. Three individuals requested new copies of the survey via the email method specified.

Analysis Procedures

A Cronbach’s alpha was also run at the completion of the collection of survey data to assess the categorization by the attributes established by Rogers. A Cronbach’s alpha over .70 was the target. This was achieved for all categories for both incentives and disincentives on all of the attributes.

Of 753 surveys sent out across Utah, 35 were returned as undeliverable, leaving a total of 718 deliverable. Of the deliverable surveys, 180 responses were received, for an overall response rate of 25.06%. Of the 180 responses received, 140 were deemed usable. Five survey responses were

removed at the request of either the recipient or of a representative of the recipient; the reasons included sickness (1), blindness (1), deceased (1), mission duty (1), and personal decline (1), leaving a total of 175. Ten of the remaining 175 responses were removed because they were missing over 20% of the survey answer values, leaving 165 total responses. Additionally, a category of “do not know” eliminated another 25 responses, leaving 140 total responses.

Although this is a descriptive research study and it was not testing a hypothesis, the survey sample size was based on numbers used for inferential statistics. Based on the Utah population of 1,383,605 for the high school graduates between the ages of 18 and 64 in 2006 (U.S. Census Bureau, 2007), a sample size of 180 achieves a confidence level of 95% and a confidence interval of 7.3%, which surpasses the initial target of having a sample size of 150 necessary to achieve a confidence level of 95% and a confidence interval of 8%. However, with only 140 of the surveys being deemed usable, that number dropped to a confidence level of 95% and a confidence interval of 8.28%.

Findings

Perceived Incentives for Use of OpenCourseWare (OCW) by the Utah Adult Population

The greatest incentive overall for OpenCourseWare use by the Utah adult population is that there is no cost for materials, followed by the materials being available at any time:

1. i26 – no cost for materials
($M = 4.59$, $SD = 0.68$),
2. i17 – available at any time
($M = 4.35$, $SD = 0.89$),
3. i12 – pursuing in depth a topic that interests me
($M = 4.24$, $SD = 0.93$),
4. i9 – learning for personal knowledge or enjoyment
($M = 4.22$, $SD = 0.93$), and
5. i27 – materials in an OCW are fairly easy to access and find
($M = 4.12$, $SD = 0.98$).

Just as no cost for materials topped the list as having the highest overall mean, it ranked the highest in the number of participants who said it was an *incentive*, *large incentive*, or *very large incentive*, with 98.57% giving it a ranking of *incentive* or better. All in all, there were twelve incentives that over 90% of respondents said were an incentive, large incentive, or very large incentive:

1. i26 – no cost for materials, 98.57%,
2. i13 – improving my understanding of particular topics, 97.14%,
3. i17 – available at any time, 96.43%,
4. i9 – learning for personal knowledge or enjoyment, 95.71%,

5. i14 – improving professional knowledge or skills, 93.57%,
6. i35 – materials available are from leading universities, 93.57%,
7. i10 – keeping my mind active, 92.86%,
8. i12 – pursuing in depth a topic that interests me, 92.81%,
9. i27 – materials in an OCW are fairly easy to access and find, 91.43%,
10. i24 – access is at my preferred pace, 90.71%,
11. i32 – high quality & reliability because the content is produced by experts in the field, 90.71%, and
12. i3 – doing research 90.65%.

Perceived Disincentives for Use of OpenCourseWare by the Utah Adult Population

Overall, the greatest disincentive for OCW use by the Utah adult population was not having a certificate or a degree awarded. The five disincentives with the highest overall means for disincentives were as follows:

1. d6 – there is no certificate or degree awarded
($M = 3.28$, $SD = 1.54$),
2. d26 – it does not cover my topic of interest in the depth I desire
($M = 3.17$, $SD = 1.31$),
3. d2 – lack of professional support provided by subject tutors or experts
($M = 3.14$, $SD = 1.25$),
4. d3 – lack of guidance provided by support specialists
($M = 3.09$, $SD = 1.26$), and
5. d25 – feeling the material is overwhelming
($M = 3.06$, $SD = 1.31$).

All in all, there were thirteen disincentives that over 60% of respondents categorized as *disincentive*, *large disincentive*, or *very large disincentive*:

1. d2 – lack of professional support provided by subject tutors or experts, 73.19%,
2. d26 – it does not cover my topic of interest in the depth I desire, 69.85%,
3. d3 – lack of guidance provide by support specialists, 69.57%,
4. d6 – there is no certificate or degree awarded, 68.57%,
5. d5 – lack of awareness of how these tools can be used effectively, 68.38%,
6. d25 – feeling the materials is overwhelming, 67.63%,
7. d27 – lack of ability to assess how I am doing to ensure I am learning, 67.14%,
8. d42 – there is currently no accreditation tied with OCW, 65%,
9. d39 – not knowing what resources exist, 64.29%,
10. d4 – availability of this mode of teaching & learning is extremely variable, 63.97%,
11. d24 – content is produced & displayed in large chunks instead of bite-sized pieces of Information, 62.59%,

12. d7 – lack of activities & events that facilitate participation in learning opportunities 62.32%, and
13. d23 – content is not structured in a ‘self learn’ or ‘self teach’ method, 62.04%.

Diffusion Attributes that Contribute to the Adoption (Incentives) of OpenCourseWare in Utah

According to Rogers, users who may adopt an innovation tend toward particular attributes when making their decision. These include (a) relative advantage, (b) compatibility, (c) complexity, (d), trialability, and (e) observability. Descriptive statistics for incentives as categorized by these attributes of innovation are provided in Table 1. The mean score for each incentive is presented along with the standard deviation. Most incentives held an *N* of 140 except in some cases where a user either purposefully or accidentally did not answer a question.

Table 1

Descriptive Statistics of Responses for Incentives by Rogers’s Attributes of Innovation (N = 140)

	Mean	Std. dev	Count
Relative advantage			
<i>i13</i> Improving my understanding of particular topics	4.13	0.8	140
<i>i6</i> Enriching or supplementing study on a formal course	3.63	1.16	140
<i>i1</i> Seeking additional information about a subject introduced in school	3.58	1.15	140
<i>i22</i> Sampling courses or study before enrolling	3.34	1.39	140
<i>i29</i> Seeing more clearly see what I will be signing up for in a “regular” class	3.32	1.4	139
<i>i2</i> Comparing courses at different educational institutions	2.91	1.36	140
<i>i11</i> Shopping around for a college to attend	2.65	1.37	140
Compatibility			
<i>i12</i> Pursuing in depth a topic that interests me	4.24	0.93	139
<i>i9</i> Learning for personal knowledge or enjoyment	4.22	0.93	140
<i>i14</i> Improving professional knowledge or skills	4.16	0.94	140
<i>i10</i> Keeping my mind active	4.04	0.90	140
<i>i3</i> Doing research	3.89	1.09	140
<i>i4</i> Furthering projects or programs	3.47	1.15	140
<i>i5</i> Improving my study skills	3.41	1.35	140
<i>i15</i> Helping understand my own abilities to learn	3.40	1.27	140
<i>i19</i> Improving my performance in academic programs	3.26	1.34	140
<i>i30</i> Help in choosing my next course	3.19	1.38	140
<i>i21</i> Improving my own materials through inclusion of OCW	3.05	1.41	140

	content			
<i>i18</i>	Improving my teaching skills	3.03	1.33	140
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Complexity				
<i>i24</i>	Access is at my preferred pace	4.01	1.08	140
<i>i25</i>	Clear and familiar structure of materials	3.56	1.13	139
<i>i23</i>	Gaining experience in online learning	3.46	1.52	140
<i>i8</i>	Using and changing the materials for personal use	3.27	1.2	139
<i>i20</i>	Saving time in creation of educational materials	3.17	1.42	139
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Triability				
<i>i26</i>	No cost for materials	4.59	0.68	140
<i>i17</i>	Available at any time	4.35	0.89	140
<i>i27</i>	Materials in an OCW are fairly easy to access and find	4.12	0.98	140
<i>i28</i>	Tools which allow users to find materials in multiple OCW's Can be accessed simultaneously by many people & infinitely	3.80	1.05	138
<i>i31</i>	replicated	3.40	1.32	140
<i>i16</i>	Freedom from discrimination on the basis of prior achievement	2.64	1.37	140
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Observability				
	High quality & reliability because the content is produced by			
<i>i32</i>	experts in the field	4.09	1.05	140
<i>i35</i>	Materials available are from leading universities	4.06	0.93	140
<i>i34</i>	Communicating with others	3.14	1.28	139
<i>i33</i>	Seeing the communications of others	3.06	1.23	140
<i>i7</i>	Two-way interaction and collaboration between groups	2.94	1.24	139

Diffusion Attributes that Contribute to Rejection (Disincentives) of OCW in Utah

Descriptive statistics for disincentives as categorized by the attributes of innovation are provided in Table 2.

Table 2

Descriptive Statistics of Responses for Disincentives by Rogers's Attributes (N = 140)

	Mean	Std. dev	Count
Relative advantage			
<i>d27</i> Lack of ability to assess how I am doing to ensure I am learning	2.97	1.26	140
<i>d21</i> There is a lack of teacher-supplied motivation, feedback & direction	2.90	1.33	140
<i>d23</i> Content is not structured in a 'self learn' or 'self teach' method	2.85	1.23	137
<i>d4</i> Availability of this mode of teaching & learning is extremely variable	2.82	1.17	136
<i>d43</i> Not clear that unstructured communication on its own is very helpful to learning.	2.52	1.16	140
<i>d1</i> The need to be a skilled self studier or independent learner	2.51	1.25	137
<i>d41</i> Concern that free resources lack quality	2.49	1.31	140
Compatibility			
<i>d6</i> There is no certificate or degree awarded	3.28	1.54	140
<i>d26</i> It does not cover my topic of interest in the depth I desire	3.17	1.31	136
<i>d8</i> Concern about intellectual property	2.68	1.28	139
<i>d9</i> There is a mismatch to my local language or culture	2.33	1.54	137
<i>d16</i> Having no intent to learn at this level	2.22	1.27	139
<i>d12</i> Education is not important for my social group or community	2.16	1.37	138
<i>d14</i> Being discouraged from engaging in additional education	2.06	1.28	139
<i>d10</i> Concern about feeling included	1.98	1.17	140
<i>d13</i> It goes against the norms or customs of my culture	1.85	1.24	137
<i>d15</i> It goes against the norms or customs of my family or community (social)	1.74	1.12	138
Complexity			
<i>d2</i> Lack of professional support provided by subject tutors or experts	3.14	1.25	138
<i>d3</i> Lack of guidance provided by support specialists	3.09	1.26	138
<i>d25</i> Feeling the material is overwhelming	3.06	1.31	139
<i>d17</i> Not understanding how to use this resource	2.80	1.40	139
<i>d24</i> Content is produced & displayed in large chunks instead of bite-sized pieces of information	2.74	1.18	139
<i>d29</i> Lack of availability of guidance materials on study skills	2.73	1.25	137
<i>d28</i> Wanting personal support through encouraging self-reflection & guidance within some of the in-text activities and formal assessments	2.63	1.19	139
<i>d18</i> Not having the qualifications to use this resource	2.55	1.33	139

<i>d38</i>	Needing to learn & understand how to navigate and use such resources	2.43	1.26	140
<i>d20</i>	Concern about handling these new ways of learning	2.39	1.14	140
<i>d11</i>	Concern about being competent or capable to study at this level	2.29	1.22	139
<i>d37</i>	Not having the qualifications or prior achievements necessary for access	2.28	1.33	140
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Trialability				
<i>d39</i>	Not knowing what resources exist	2.92	1.30	140
<i>d40</i>	Not understanding what the resources are	2.84	1.33	140
<i>d32</i>	Limited or no access to the Internet	2.58	1.73	140
<i>d31</i>	Limited or no access to a computer	2.57	1.73	140
<i>d33</i>	Other technical barriers preventing easy use or reuse	2.56	1.44	140
<i>d19</i>	Concern about handling these new technologies	2.39	1.28	140
<i>d34</i>	Physical circumstances that limit my access	2.20	1.42	139
<i>d35</i>	The cost of being online	2.12	1.36	140
<i>d36</i>	Being geographically remote	1.92	1.27	139
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Observability				
<i>d42</i>	There is currently no accreditation tied with OCW	3.02	1.47	140
<i>d5</i>	Lack of awareness of how these tools can be used effectively	3.01	1.22	136
<i>d7</i>	Lack of activities & events that facilitate participation in learning opportunities	2.79	1.19	138
<i>d22</i>	Feeling educational materials & opportunities are not as open as possible	2.68	1.18	138
<i>d30</i>	Lack of recording of learning & achievements in e-portfolios or journals	2.50	1.18	139

Thematic Findings

Perceived Incentives for Use of OpenCourseWare (OCW) by the Utah Adult Population

In order to better understand the greatest incentive questions for OpenCourseWare use, a comparison of the mean ranking and frequency rating was performed.

Table 3

Greatest Incentive Questions for OpenCourseWare Use

Mean ranking	Frequency ranking	Question
1 (4.59)	1 (98.57%)	i26 No cost for materials
2 (4.35)	3 (96.43%)	i17 Available at any time
3 (4.24)	8 (92.81%)	i12 Pursuing in depth a topic that interests me
4 (4.22)	4 (95.71%)	i9 Learning for personal knowledge or enjoyment
5 (4.16)	5 (93.57%)	i14 Improving professional knowledge or skills
6 (4.13)	2 (97.14%)	i13 Improving my understanding of particular topics
7 (4.12)	9 (91.43%)	i27 Materials in an OCW are fairly easy to access and find High quality & reliability because the content is produced by
8 (4.09)	11 (90.71%)	i32 experts in the field
9 (4.06)	6 (93.57%)	i35 Materials available are from leading universities
10 (4.04)	7 (92.86%)	i10 Keeping my mind active
11 (4.01)	10 (90.71%)	i24 Access is at my preferred pace
12 (3.89)	12 (90.65%)	i3 Doing research

From these combined results, three themes emerge: (a) self-directed knowledge and learning, (b) convenience, and (c) quality.

- The self-directed learning aspects can be seen in questions i3 – doing research, i9 – learning for personal knowledge or enjoyment, i10 – keeping my mind active, i12 – pursuing in depth a topic that interests me, i13 – improving my understanding of particular topics, and i14 – improving professional knowledge or skills.
- Convenience aspects can be seen in i17 – available at any time, i24 – access is at my preferred pace, i26 – no cost for materials, and i27 – materials in an OCW are fairly easy to access and find.
- Quality aspects can be seen in i32 – high quality and reliability because the content is produced by experts in the field and i35 – materials available are from leading universities.

The desire for self-directed knowledge and learning coincides with the compatibility attribute as it addresses perceived needs and values. The desire for convenience and quality coincides with the relative advantage attribute in that it is perceived as being better than other options.

Perceived Disincentives for Use of OpenCourseWare (OCW) by the Utah Adult Population

In order to better understand the greatest disincentive questions for OCW use, a comparison of the mean ranking and frequency rating was performed, the results of which are presented in Table 4.

Table 4

Greatest Disincentive Questions for OpenCourseWare Use

Mean ranking	Frequency ranking	Question
1 (3.28)	4 (68.57%)	d6 There is no certificate or degree awarded
2 (3.17)	2 (69.85%)	d26 It does not cover my topic of interest in the depth I desire
3 (3.14)	1 (73.19%)	d2 Lack of professional support provided by subject tutors or experts
4 (3.09)	3 (69.57%)	d3 Lack of guidance provided by support specialists
5 (3.06)	6 (67.63%)	d25 Feeling the material is overwhelming
6 (3.02)	8 (65%)	d42 There is currently no accreditation tied with OCW
7 (2.97)	7 (67.14%)	d27 Lack of ability to assess how I am doing to ensure I am learning
7 (3.01)	5 (68.38%)	d5 Lack of awareness of how these tools can be used effectively
8 (2.92)	9 (64.29%)	d39 Not knowing what resources exist
9 (2.85)	13 (62.04%)	d23 Content is not structured in a 'self learn' or 'self teach' method
10 (2.84)		d40 Not understanding what the resources are
11 (2.82)	10 (63.97%)	d4 Availability of this mode of teaching & learning is extremely variable
12 (2.8)		d17 Not understanding how to use this resource
13 (2.79)	12 (62.32%)	d7 Lack of activities & events that facilitate participation in learning opportunities
14 (2.74)	11 (62.59%)	d24 Content is produced & displayed in large chunks instead of bite-sized pieces of information

In consideration of these combined results, five themes emerge: (a) lack of support, (b) no valid certification, (c) topic issues, (d) lack of content, and (e) lack of resource knowledge.

- Lack of support aspects can be seen in d2 – lack of professional support provided by subject tutors or experts and d3 – lack of guidance provided by support specialists.
- Lack of valid certification aspects can be seen in d6 – there is no certificate or degree awarded and d42 – there is currently no accreditation tied with OCW.
- Topic issue aspects can be seen in d25 – feeling the material is overwhelming and d26 – it does not cover my topic of interest in the depth I desire.
- Issues around lack of content can be seen in d4 – availability of this mode of teaching & learning is extremely variable, d7 – lack of activities & events that facilitate participation in learning opportunities, d23 – content is not structured in a ‘self learn’ or ‘self teach’ method, d24 – content is produced and displayed in large chunks instead of bite-sized pieces of information, and d27 – lack of ability to assess how I am doing to ensure I am learning.
- Lack of resource knowledge aspects can be seen in d5 – lack of awareness of how these tools can be used effectively, d17 – not understanding how to use this resource, d39 – not knowing what resources exist, and d40 – not understanding what the resources are.

A lack of support is related to the complexity attribute, as is a lack of resource knowledge. The issues of having no valid certification, topic issues, and lack of content issues relate to the compatibility attribute; the users, it seems, do not feel the resources are consistent with their current needs.

Incentives in the Use of OpenCourseWare (OCW) in Utah by Age, Income, Gender, Education, County, Occupation, and Ethnicity

Some significant correlations were found at both the .05 and .01 levels, but all of the correlations were low:

- The highest correlation between age and incentives was question 22 – sampling courses or study before enrolling $r(135) = -.336, p < .0001$.
- The highest correlation between income and incentives was question 26 – no cost for materials $r(135) = -.307, p < .0003$.
- All correlations between incentives and both gender and education, although statistically significant, were under .25.
- There were no significant correlations between incentives and county, occupation, or ethnicity.

Although the statistical results were significant, they were low when comparing incentives and demographic variables. It is an area for further analysis and should be considered, but it is beyond

the scope of this report. A breakdown of the overall results for each demographic variable is available at <http://digitalcommons.usu.edu/etd/389/>.

Disincentives that Prevent the Use of OpenCourseWare (OCW) in Utah by Age, Income, Gender, Education, County, Occupation, and Ethnicity

Some significant correlations were found at both the .05 and .01 levels, but all of the correlations were low:

- The highest correlation between age and disincentives was question 21 – there is a lack of teacher-supplied motivation, feedback & direction $r(135) = -.390, p < .0000$.
- The highest correlation between income and disincentives was question 23 – content is not structured in a ‘self learn’ or ‘self teach’ format $r(132) = -.274, p < .0014$.
- The highest correlation between education and disincentives was question 2 – lack of professional support provided by subject tutors or experts $r(133) = -.225, p < .0090$.
- There were no significant correlations found between disincentives and county, occupation, gender, or ethnicity.

Similar to the statistical results for incentives, the correlations were statistically significant but low when comparing disincentives and demographic variables. Additional analysis of the correlations is available at <http://digitalcommons.usu.edu/etd/389/>.

Diffusion Attributes that Contribute to the Adoption (Incentives) of OpenCourseWare (OCW) in Utah

In looking at incentives based on the attributes of innovation, trialability has the highest overall mean score of 3.82 on a five-point scale, compatibility has an overall mean of 3.61, complexity has an overall mean of 3.49, observability has an overall mean of 3.46, and relative advantage has an overall mean of 3.37.

Based on Rogers, it was expected that relative advantage would be the most influential of all of the attributes of innovation as a predictor of the overall weighted mean for incentives (Rogers, 2007). However, the construct of compatibility was the highest influence, explaining 34.88% of all variability. Compatibility is the degree to which an innovation is perceived as consistent with existing values, experiences, and needs and includes items like socio-cultural values and beliefs, previously introduced ideas, and client needs (Rogers, 2007). Relative advantage placed second, explaining 19% of all variability; this was followed by trialability, explaining 18.34% of all variability.

Diffusion Attributes that Contribute to Rejection (Disincentives) of OpenCourseWare (OCW) in Utah

Considering disincentives categorized by the attributes of innovation, observability has the greatest negative influence with an overall mean of 2.80 on a five-point scale, then relative advantage at 2.72, complexity at 2.69, trialability at 2.46, and compatibility at 2.35.

It was expected that the attributes as a predictor of the overall weighted mean for disincentives would be complexity or compatibility (Rogers, 2007). As Rogers noted, compatibility of an innovation with a preceding idea can either speed up or retard its rate of adoption. A negative experience with one innovation can actually significantly harm the adoption of another one and is referred to as information negativism. Plus, potential adapters might not recognize they have a need for an innovation until they become aware of it, and its consequences. In considering complexity, Rogers notes that the complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption. He notes that although complexity may not be as important overall as relative advantage or compatibility, for some new ideas complexity can be a very important barrier to adoption.

Complexity, or the degree to which an innovation is perceived as relatively difficult to understand and use, was indeed the greatest predictor, explaining 29.37% of all variability. This predictor was followed, however, by trialability, which explained 27.16% of all variability. After that came compatibility, the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs, which explained 24.63% of all variability.

Discussion and Recommendations

Learning and *knowledge* are perhaps the most significant incentives for using OpenCourseWare (OCW). However, based on this study, individuals are not driven to use OCW as a precursor to attending a particular institution or to taking a particular traditional class as these questions were asked specifically on the survey. Related incentive questions, which were *not* highly ranked compared to other incentives, include the following:

1. i2 – comparing courses at different educational institutions
($M = 2.91$, $SD = 1.36$),
2. i11 – shopping around for a college to attend
($M = 2.65$, $SD = 1.37$),
3. i22 – sampling courses or study before enrolling
($M = 3.34$, $SD = 1.39$),
4. i29 – seeing more clearly what I will be signing up for in a regular class
($M = 3.32$, $SD = 1.4$), or
5. i30 – help in choosing my next course
($M = 3.19$, $SD = 1.38$).

These results imply that users are self-directed learners. Perhaps the only exception to this is in considering that there was a small correlation between the following three incentives and age:

1. i22 – sampling courses or study before enrolling ($M = 3.34$, $SD = 1.39$) $r(135) = -.336$, $p < .0001$,
2. i29 – seeing more clearly what I will be signing up for in a regular class ($M = 3.32$, $SD = 1.4$) $r(134) = -.318$, $p < .0002$, and
3. i30 – help in choosing my next course ($M = 3.19$, $SD = 1.38$) $r(135) = -.331$, $p < .0001$.

Yet, at the same time, there were significant disincentives beyond cost, a lack of support, and no valid certification. Institutions offering OCW could perhaps work to transition some OCW users into degree-granting paid programs by (a) noting available degrees or courses associated with the class the individual is reviewing or (b) permitting a more flexible model of institution entry where individuals could enter into a program at their level of competency. A “test drive” model can be developed to promote or market an institution, using OCW as a maven trap (Gladwell, 2002). Implementing this model would help users keep their educational costs down, while receiving desired support and valid certification.

Offering a flexible entry model into traditional at-a-cost education could be accomplished by offering some type of testing to determine if the OCW user comprehended and mastered the course objectives. If testing is offered, the OCW website could suggest other OCW courses of potential interest as well as provide information about associated degrees or traditional instructor-led courses that seem to be a good fit. A tool that accomplishes this recommendation already exists and is known as the OER Recommender (see <http://www.oerrecommender.org>). Examples of recommendations can be viewed on Utah State’s OCW website at <http://ocw.usu.edu>. The users could find their personal level of competency using measurable assessments. Once the users reached their maximum capability and did not pass a measurable assessment, the results message could explain the potential benefits of traditional instructor-led education for areas they need more help with, noting that although there would now be a cost there would also be support as well as acknowledged and accredited certification or degrees granted. The site could also note traditional at-a-cost classes for which there are no OCW alternatives, yet are practical for their area of interest. This may include classes for which there is extensive lab time, expensive equipment requirements, or requisite instructor-led time. For it to be attractive to the end user, however, the user would need to enter into traditional education at their level of competency. A competency model is where a student can prove competency in a particular subject area and receive credit for that area. One value that should be noted on OCW sites, if applicable, is institutional accreditation.

It should be noted that according to this study there is no direct relation between the amount of education a potential OCW user has and the incentives for OCW use, so institutions might also want to re-assess their presumptions relating to prior educational attainment in relation to who may be using, and potentially mastering, OCW materials.

Lack of content or topic issues is another area that surfaced as a disincentive. This disincentive could, in part, be remedied by elevating the status of current OCW/OER recommendation engines such as ccLearn DiscoverEd (see <http://discovered.creativecommons.org/search/>), OCW Finder (see <http://www.ocwfinder.com/>), or OER Recommender (see <http://www.oerrecommender.org>) and perhaps merging the capabilities of each into a singular engine. OCW websites should make their content available to these recommendation engines via tags for their content and should reciprocally link to one or more of these sites. Although users might leave one particular institutional site in favor of content in another, they are encouraged to continue their pursuit of knowledge, and this is one of the ultimate goals of OCW and the open educational resources movement.

A final disincentive category that emerged was a lack of knowledge of the resources available either altogether or in regard to how to best use them. A marketing campaign could help with overall awareness. In order to market an innovation, a good starting point is to consider the consumer's innovation decision process. According to Rogers this process entails (a) knowledge of an innovation's existence and function, (b) persuasion toward or away from the innovation, (c) decision to adopt or reject the innovation, (d) implementation of the decision, and (e) confirmation, which reinforces or reverses the decision (2003, p. 169). Based on the survey results, a number of potential users would need to be informed about OCW and its use. This factor is present in the results of d5 – lack of awareness of how these tools can be used effectively ($M = 3.01, SD = 1.22$), d17 – not understanding how to use this resource ($M = 2.8, SD = 1.4$), d39 – not knowing what resources exist ($M = 2.92, SD = 1.3$), and d40 – not understanding what the resources are ($M = 2.84, SD = 1.33$).

In marketing efforts it is suggested that institutions follow Rogers's advice for campaign communications. Campaign communications include (a) using formative research to understand the intended audiences and campaign messages, (b) setting specific and realistic campaign goals, (c) using audience segmentation to create more homogenous audience groups, and (d) designing mass media messages that trigger interpersonal network communication to occur.

Equally, institutions will want to identify potential opinion leaders, change agents, and champions. As Rogers notes, opinion leaders provide information and advice about innovations to many individuals in the system (2003, p. 27). Change agents influence an individual's decisions toward the innovation (2003, p. 27). Champions put their weight behind an innovation, thus overcoming indifference or resistance (2003, p. 414). Rogers asserts that mass media is best for communicating at the knowledge acquisition stage to inform potential users of the innovation, and interpersonal communications are best used at the persuasion stage to influence potential users. Institutions will want to consider marketing OCW and other related open educational resources as technology clusters to encourage more rapid diffusion results.

Confusion relating to OCW usage itself will be difficult to resolve across institutions or even across departments within an institution; efforts to offer consistency in the user experiences across course offerings is advisable.

Conclusion

There is little doubt that open educational resources, including OpenCourseWare (OCW), will have an impact on education worldwide. What is unknown, however, is the scope, breadth, and depth of that impact. One must consider the consequences of diffusion of the OCW innovation, remembering that those consequences may be desirable or undesirable, direct or indirect, and anticipated or unanticipated.

There are many possible futures. The intent of this research is to help drive OCW projects a step closer to satisfying end-user desires and expectations, thus promoting their use as educational change agents. It is important to understand the perceptions of the end users because, as Rogers notes, “Perceptions count. The individual’s percepts of the attributes of an innovation, not the attributes as classified objectively by experts or change agents, affect its rate of adoption” (Rogers, 2003, p. 223). This study incorporated all assessed incentives and disincentives into Rogers’s attributes of innovation. However, it should be noted that according to Rogers, 47% to 87% of variance in the rate of adoption is explained by the five attributes. Other factors include the type of innovation, communication channels used, the nature of the social systems, and the extent of the change agent’s promotion efforts (2007).

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Appendix

Distribution Survey of OpenCourseWare Incentives and Disincentives

OCW (OCW) is dedicated to the development of freely available, stand-alone college-level online course and teaching materials on a variety of topics. It includes items such as lecture notes, reading lists, course assignments, syllabi, study materials, simulations, and the like as used in current courses which are then made freely available on the Internet.

Some of the OCW projects available to you include:

- Carnegie Mellon OpenLearningInitiative at <http://www.cmu.edu/oli/>
- Johns Hopkins Bloomberg School of Public Health OCW at <http://OCW.jhsph.edu/>
- Massachusetts Institute of Technology OCW at <http://OCW.mit.edu/>
- University of Notre Dame OCW at <http://OCW.nd.edu/>
- Tufts University OCW at <http://OCW.tufts.edu/>
- University of California, Irvine OCW at <http://OCW.uci.edu/>, and
- Utah State University OCW at <http://OCW.usu.edu/>

Please indicate how much of an **INCENTIVE** each of these characteristics would be to you personally, where **1 means “not an incentive at all” and 5 means “very large incentive”**. Please choose “do not know” if you feel you cannot answer this question.

	Not	Large			
	1	2	3	4	5
Seeking additional information about a subject introduced in school	1	2	3	4	5
Comparing courses at different educational institutions	1	2	3	4	5
Doing research	1	2	3	4	5
Furthering projects or programs	1	2	3	4	5
Improving my study skills	1	2	3	4	5
Enriching or supplementing study on a formal course	1	2	3	4	5
Two-way interaction and collaboration between groups	1	2	3	4	5
Using and changing the materials for personal use	1	2	3	4	5
Learning for personal knowledge or enjoyment	1	2	3	4	5
Keeping my mind active	1	2	3	4	5
Shopping around for a college to attend	1	2	3	4	5
Pursuing in depth a topic that interests me	1	2	3	4	5
Improving my understanding of particular topics	1	2	3	4	5
Improving professional knowledge or skills	1	2	3	4	5
Helping understand my own abilities to learn	1	2	3	4	5
Freedom from discrimination on the basis of prior achievement	1	2	3	4	5
Available at any time	1	2	3	4	5
Improving my teaching skills	1	2	3	4	5
Improving my performance in academic programs	1	2	3	4	5
Saving time in creation of educational materials	1	2	3	4	5
Improving my own materials through inclusion of OCW content	1	2	3	4	5
Sampling courses or study before enrolling	1	2	3	4	5
Gaining experience in online learning	1	2	3	4	5
Access is at my preferred pace	1	2	3	4	5
Clear and familiar structure of materials	1	2	3	4	5

*Incentives and Disincentives for the Use of OpenCourseWare
Arendt and Shelton*

No cost for materials	1	2	3	4	5
Materials in an OCW are fairly easy to access and find	1	2	3	4	5
Tools which allow users to find materials in multiple OCW's	1	2	3	4	5
Seeing more clearly see what I will be signing up for in a "regular" class	1	2	3	4	5
Help in choosing my next course	1	2	3	4	5
Can be accessed simultaneously by many people & infinitely replicated	1	2	3	4	5
High quality & reliability because the content is produced by experts in the field	1	2	3	4	5
Seeing the communications of others	1	2	3	4	5
Communicating with others	1	2	3	4	5
Materials available are from leading universities	1	2	3	4	5

Do not know:

Other: _____

Please indicate how much of a **DISINCENTIVE** each of these characteristics would be to you personally, where **1 means "not at all a disincentive" and 5 means "very large disincentive"**. Please choose "do not know" if you feel you cannot answer this question.

	Not			Large	
The need to be a skilled self-studier or independent learner	1	2	3	4	5
Lack of professional support provided by subject tutors or experts	1	2	3	4	5
Lack of guidance provided by support specialists	1	2	3	4	5
Availability of this mode of teaching & learning is extremely variable	1	2	3	4	5
Lack of awareness of how these tools can be used effectively	1	2	3	4	5
There is no certificate or degree awarded	1	2	3	4	5
Lack of activities & events that facilitate participation in learning opportunities	1	2	3	4	5
Concern about intellectual property	1	2	3	4	5
There is a mismatch to my local language or culture	1	2	3	4	5
Concern about feeling included	1	2	3	4	5
Concern about being competent or capable to study at this level	1	2	3	4	5
Education is not important for my social group or community	1	2	3	4	5
It goes against the norms or customs of my culture	1	2	3	4	5
Being discouraged from engaging in additional education	1	2	3	4	5
It goes against the norms or customs of my family or community (social)	1	2	3	4	5
Having no intent to learn at this level	1	2	3	4	5
Not understanding how to use this resource	1	2	3	4	5
Not having the qualifications to use this resource	1	2	3	4	5
Concern about handling these new technologies	1	2	3	4	5
Concern about handling these new ways of learning	1	2	3	4	5

*Incentives and Disincentives for the Use of OpenCourseWare
Arendt and Shelton*

There is a lack of teacher-supplied motivation, feedback & direction	1	2	3	4	5
Feeling educational materials & opportunities are not as open as possible	1	2	3	4	5
Content is not structured in a 'self-learn' or 'self-teach' method	1	2	3	4	5
Content is produced & displayed in large chunks instead of bite-sized pieces of information	1	2	3	4	5
Feeling the material is overwhelming	1	2	3	4	5
It does not cover my topic of interest in the depth I desire	1	2	3	4	5
Lack of ability to assess how I am doing to ensure I am learning	1	2	3	4	5
Wanting personal support through encouraging self-reflection & guidance within some of the in-text activities and formal assessments	1	2	3	4	5
Lack of availability of guidance materials on study skills	1	2	3	4	5
Lack of recording of learning & achievements in e-portfolios or journals	1	2	3	4	5
Limited or no access to a computer	1	2	3	4	5
Limited or no access to the Internet	1	2	3	4	5
Other technical barriers preventing easy use or reuse	1	2	3	4	5
Physical circumstances that limit my access	1	2	3	4	5
The cost of being online	1	2	3	4	5
Being geographically remote	1	2	3	4	5
Not having the qualifications or prior achievements necessary for access	1	2	3	4	5
Needing to learn & understand how to navigate and use such resources	1	2	3	4	5
Not knowing what resources exist	1	2	3	4	5
Not understanding what the resources are	1	2	3	4	5
Concern that free resources lack quality	1	2	3	4	5
There is currently no accreditation tied with OCW	1	2	3	4	5
Not clear that unstructured communication on its own is very helpful to learning.	1	2	3	4	5

Do not know:

Other: _____

Thank you for completing this survey. Please now place it in the enclosed envelope and drop it in the postal mail.

