Self-directed Learners' Perceptions and Experiences of Learning STEM through MIT OCW

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We hope this is a "Magical" talk.

INSIDE HIGHER ED

Teaching in Costume Today? Win Chocolate!

By Scott Jaschik // October 31, 2019

Are you teaching in costume today? Administrating in disguise? If so, tweet a photo with the hashtag #IHEhalloween and we'll award a box of Godiva chocolates for the most creative attire. Bonus points for costumes with academic themes. The winner will be announced next week.

Happy Halloween to all of our readers.

Outline

1. Quick trend data
2. Research Background
3. Research Purpose and Questions
4. Research Design
5. Results and Recap
6. Discussion and Conclusion

September 10, 2019
The Future of Learning, Transforming Access
Simon Nelson, CEO, FutureLearn, PCF9 Conference, Edinburgh, Scotland

And the threat of AI and automation is very real. A 2017 report by McKinsey found that half of all current work activities could be automated, using technology that already exists. and that by 2030 anywhere from 75 million to 375 million workers worldwide will be displaced from their old jobs and require retraining.

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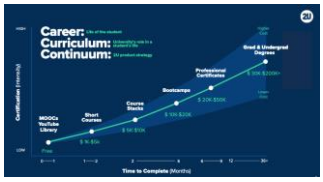
March 13, 2019

The Career Curriculum Continuum

Andrew Hermalyn, Inside Higher Ed

https://www.insidehighered.com/digital-learning/views/2019/03/13/how-networkflow-can-stay-center-learners-lives-opinion



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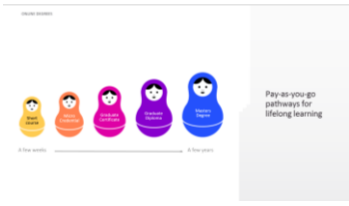

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Open Education

Open Education Includes OpenCourseWare

Research Background

Research Background

MOOC Projects:

- Bonk, C. J., Zhu, M., Kim, M., Xu, S., Sabir, N., & Sari, A. (2018, September). Pushing toward a more personalized MOOC: Exploring instructor selected activities, resources, and technologies for MOOC design and implementation. *The International Review of Research on Open and Distributed Learning (IRRODL), 19*(4), 92-115.
- Zhu, M., Bonk, C. J., & Sari, A. (2018, December). Instructor experiences designing MOOCs in higher education: Pedagogical, resource, and logistical considerations and challenges. *Online Learning, 22*(4), 203-241.
- Zhu, M., Bonk, C. J., & Sari, A. (2018). MOOC instructor motivations, innovations, and designs: Surveys, interviews, and course reviews. *Canadian Journal of Learning and Technology, 45*(1), 1-22. Available: https://www.cjlt.ca/index.php/cjlt/article/view/27795
- Doo, M. Y., Tang, Y., Bonk, C. J., & Zhu, M. (2019). A Mixed Methods Look at MOOC Instructor Motivation and Career and Professional Development. *Distance Education, 40*(1).
- Sari, A. R., Bonk, C. J., & Zhu, M. (2019). MOOC Instructor Designs and Challenges: What can be Learned from Existing MOOCs in Indonesia and Malaysia? *Asia Pacific Education Review.*
- Zhu, M., & Bonk, C. J. (2019). Designing MOOCs to facilitate participant self-directed learning: An analysis of instructor perspectives and practices. *International Journal of Self-Directed Learning.*
- Zhu, M., & Bonk, C. J. (in press for 2019). Designing MOOCs to Facilitate Participant Self-monitoring for Self-directed Learning. For Special Issue: *Online Learning.*
- Zhu, M., Sabir, N., Bonk, C. J., Sari, A., Xu., S., & Kim, M. (in review). Addressing Learner Cultural Diversity in MOOC Design and Delivery: Strategies and Practices of Instructors and Experts. *Educational Technology Research and Development (ETR&D).*
- An, Y.-J., Zhu, M., Bonk, C. J., & Lin, L. (in review). Exploring instructors' perspectives, practices, and perceived support needs and barriers related to the gamification of MOOCs. *Journal of Computing in Higher Education.*

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Research Background

OCW Projects:

- Lee, M., Lin, M.-F., & Bonk, C. J. (2007, November). OOPS, turning MIT OpenCourseWare into Chinese: An analysis of a community of practice of global translators. *International Review of Research in Open and Distance Learning, 8*(3). https://doi.org/10.19173/irrodl.v8i3.463
- Bonk, C. J., Lee, M. M., Kou, X., Xu, S. & Sheu, F.-R. (2015). Understanding the self-directed online learning preferences, goals, achievements, and challenges of MIT OpenCourseWare subscribers. *Educational Technology and Society, 18*(2), 349-368. Available: https://www.j-ets.net/ETS/journals/18_2/26.pdf
- Zhu, M., & Bonk, C., J. (2019, October). *Self-directed Learners' Perceptions and Experiences of Learning STEM through MIT OCW.* 2019 Open Education Conference, Phoenix, AZ.

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- Zhu, M., Herring, S. C., & Bonk, C. J. (2019). Exploring presence in online learning through three forms of computer-mediated discourse analysis. *Distance Education*, *40*(2), 205-225. DOI: 10.1080/01587919.2019.1600365

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Research Background

- One of the earliest OER, the Massachusetts Institute of Technology (MIT) OpenCourseWare (OCW), **shared MIT course materials and classroom recording videos** with the public for **free and open access.**
- The latest MIT OCW report indicated that more than **2,400 courses** were published. Among them, approximately **100 are full video courses** (MIT OCW report, 2018).

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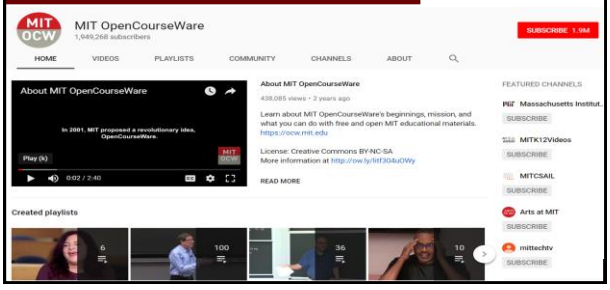
MIT OCW YouTube



Research Background

- For the last two decades, MIT OCW are **accessible for self-directed learners around the world** to explore, learn, download, and share (Bonk, Lee, Kou, Xu, & Sheu, 2015)
- By December 2018, approximately **160 million users** visited their website as well as **YouTube videos** (MIT OCW report, 2018)

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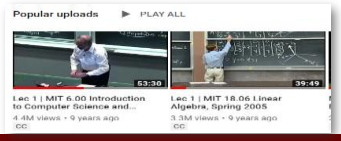
Research Background

- The **most popular** MIT OCW YouTube videos are related to **STEM subjects** such as computer science and algebra
- However, few studies have examined MIT OCW **self-directed learners' perceptions, learning experiences, and challenges**.



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Research Background

- Communities of Inquiry (CoI) (Garrison et al., 2000) research has shown that the framework provides an important **conceptual perspective for examining communication and interaction** (e.g., Akyol et al., 2009; Garrison et al., 2000) and **learners' perceived learning and satisfaction** (Arbaugh, 2008) in online learning environments.

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Research Background

- CoI framework includes three interdependent dimensions, namely:

(a) social presence,

(b) cognitive presence, and

(c) teaching presence (Garrison et al., 2000).

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Research Background

ELEMENTS	CATEGORIES	INDICATORS (examples only)
Social Presence	Open Communication Group Cohesion Affective Expression	Risk-free expression Encourage collaboration Emoticons
Cognitive Presence	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
Teaching Presence	Design & Organization Facilitating Discourse Direct Instruction	Setting curriculum & methods Sharing personal meaning Focusing discussion

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Research Background

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Research Purpose and Questions

Research Purpose

- The purpose of this study was to inform OER designers and developers of the aspects to consider by uncovering **learners' perceptions, learning experiences, and challenges** while learning STEM courses through MIT OCW YouTube videos using **CoI framework.**

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Research Questions

1. What were **learners' perceptions** of the MIT OCW YouTube videos?
2. How was **social presence** manifested in MIT OCW YouTube comments?
3. How was **cognitive presence** manifested in MIT OCW YouTube comments?
4. What are **the challenges** while learning in MIT OCW YouTube videos?

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Research Design

Research Design

- This study used **case study** approach to empirically analyze persons, events, decisions, and projects in a real-life context (Thomas, 2011; Yin, 1994).
  1. **MIT 6.00 Introduction to Computer Science and Programming with 23 videos**
  2. **MIT 18.06 Linear Algebra with 34 videos.**

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Data Collections and Analysis

- Researchers collected all the comments of each video through NCapture for NVivo. The total number of comments for each course was around **3,000**.
- **Thematic analysis** (Braun, Clarke, & Rance, 2014) and **computer mediated discourse analysis (CMDA)** (Herring, 2004) were used to analyze the data.
- For research questions (RQ) 1 and 4, researchers conducted thematic analysis. For RQs 2 and 3, both thematic analysis and CMDA were used.

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Results

RQ1 Learners' Perceptions of the MIT OCW YouTube videos

- MIT OCW learners from **appreciated** that MIT shared the **free** and **high quality learning materials** with the public
- MIT OCW **saved a large amount of money** for the learners reported in the comments. One participant stated that:

  I'm 16 and going to finish high school in a few months or so and God, I wish I could have gone to MIT. **If only I had the money, ugh. But I am SO grateful that I get to see a glimpse of it at OpenCourseWare, at least**. Thank so much for this, MIT.

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RQ1 Learners' Perceptions of the MIT OCW YouTube videos

- In addition, learners also appreciate **the high quality courses** below:

  I have been seeing many introduction to programming videos and this is by far the best one out there. **Not only did it make me want to program more, it also wanted to make me want to stick to the skills**. I'll hopefully learn. :) Good Job

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RQ2 Social Presence

- **Social presence in the YouTube comments was relatively low comparing to that in other social media. (Linguistic Inquiry and Word Count-LIWC)**

Table 1. MIT 6.0 Introduction to Computer Science and Programming
Word frequency counts (values normalized per 100 words) **; Note: Lec refers to lecture video.**

Items	Word count	1st-pers. sg. pronouns	Social words	Positive emotions	Negative emotions	Cognitive process	Analytic	Clout	Authenticity	Emotional tone
Social		5.51	9.71	4.57	2.1	10.77	55.92	55.45	55.66	63.35
Lec1	24977	4.44	7.59	4.38	1.07	12.05	58.57	54.76	33.51	84.23
Lec2	14542	3.51	7.24	3.95	1.06	13.11	57.15	50.61	28.34	78.65
Lec3	6694	3.94	7.19	4.11	1.48	13.12	60.75	49.34	28.45	74.70
Lec4	5125	2.61	5.99	3.14	1.58	13.03	58.04	46.41	22.41	55.18

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RQ2 Social Presence

- Through thematic analysis, we found that OCW learners seldom expressed their **personal emotions** during learning. There were social interaction at the beginning of the course; however, **the social interaction between learners decreased** at the end of the course.

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RQ3 Cognitive Presence

- **Learners cognitive presence was highly manifested in the comments**

Items	Word count	1st-pers. sg. pronouns	Social words	Positive emotions	Negative emotions	Cognitive process
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Lec4	5125	2.61	5.99	3.14	1.58	13.03

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RQ3 Cognitive Presence

- Learners mainly discussed learning **content and knowledge** in the comments. They tried to **seek help for cognitive learning**
  - For example, one learner asked questions about the difficulties he/she encountered, "*When trying to write the code at 32 mins. I get a syntax error on line 2. Why will this not work on my version of Python? x=15.*"
  - Similarly, another learner's query was "*When he is defining values, under numbers, under the number 3, is that a comma or a period? Is it float 3,14 or 3.14? Thanks.*"

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RQ4 Challenges

- Two general challenges were identified: (1) **technology challenges** and (2) **social learning**.

  For **technology challenges**, learners had trouble recognize the words on the screen due to the blurry video. One learner stated: *I appreciated these videos but why they are so blurry. I am not able to figure out the things. Is there any alternative to these videos.*

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RQ4 Challenges

- **Social learning**

  Learners wanted to create **a small team** to learn specific topic. For instance, one learner said: "*Looking for someone to study Computer Science with, anyone wanna team up? (Real responses please.)*" Other learners replied to the post by saying, "*Send me a PM*" or "*Everyone here wanting to Skype about CS, add me. I would like to hang out with people who want to learn coding too!*"

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Discussion and Conclusion

Recap of Findings

- **Positive perceptions** of free and high quality courses.
- Relatively **low social presence** comparing to that in general social media.
- Relatively **high cognitive presence** comparing to that in general social media.
- **Technology** challenges and **social learning**.

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Discussion and Conclusions

- **Can apply CoI framework to informal environment.**
- **OCW has a positive impact for self-directed learners (SDL) around the world.**
- **Even SDL learners seek community support.**

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Limitations

- Two courses from MIT OCW.
- STEM-related courses.
- One data source--YouTube comments.
- No direct observations or interviews.

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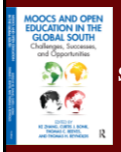
Thank you!
Questions and Comments?



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