

**Self-Direct to Learn, Self-Direct to Live:  
Learner Choices, Experiences, and Possibilities in a Self-Directed Learning World**

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**December 14, 2021**  
**A Decade of MOOCs: A Review of MOOC Stats and Trends in 2021**  
**Dhawal Shah, Class Central**  
<https://www.classcentral.com/report/mooc-stats-and-trends-2021/>

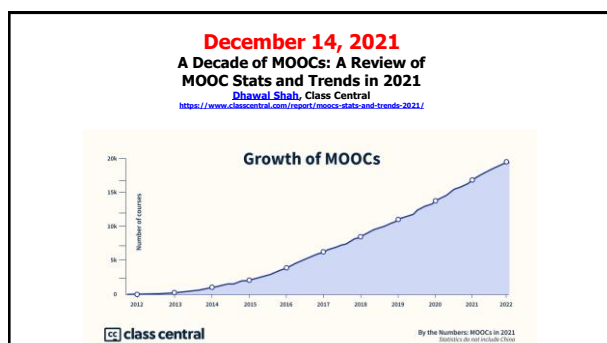
**220M** Students  
**950** Universities

**19.4k** Courses  
**1670** Microcredentials  
**70** MOOC-based degrees

**class central**

By the Numbers: MOOCs in 2021  
Statistics do not include China

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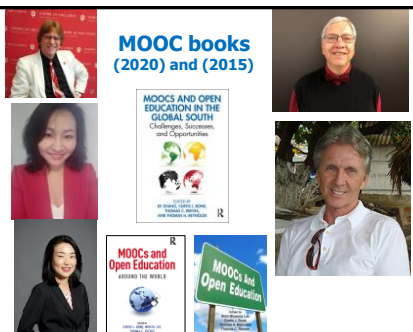
**December 14, 2021**  
**A Decade of MOOCs: A Review of MOOC Stats and Trends in 2021**  
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New Registered Users	2019	2020	2021	Total
<b>coursera</b>	8M	31M	<b>21M</b>	97M
<b>edX</b>	5M	10M	<b>7M</b>	42M
<b>swayam</b>	NA	6M	<b>6M</b>	22M
<b>Future Learn</b>	1.3M	4M	<b>2M</b>	17M

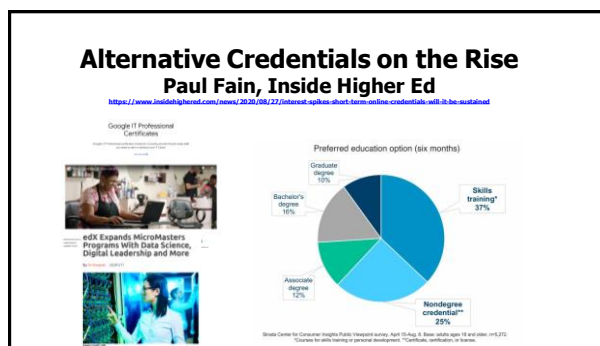
**class central**

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**MOOC books (2020) and (2015)**



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**October 22, 2021**  
**Wanted:**  
**Billions of Self-Directed Learners**  
<https://www.aspenmatters.io/article/training-development/the-need-of-self-directed-learning-for-new-role-and-skills-24348>

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**Benefits of Self-Directed Learners**  
<https://discoverpraxis.com/reasons-not-to-go-to-college/>

**THE BENEFITS OF SELF-DIRECTED LEARNING**

- ✓ Teaches you to take initiative and create value
- ✓ Builds self-confidence
- ✓ Teaches perseverance and flexibility
- ✓ Kindles intrinsic motivation
- ✓ Promotes self-awareness
- ✓ Helps you find a career you find personally fulfilling
- ✓ Allows you to learn skills more holistically
- ✓ Teaches social skills
- ✓ Lets you explore a wider range of interests
- ✓ Gives you the practical experience to ascertain what you've learned

PRAXIS

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**Study #1. Nepali Youth Learn from MOOCs**

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The name of the Himalayan peak is Mt. Nilgiri with 7061 Meters height.

Bishwa Raj Gautam, Program Specialist, Regional English Language Office (RELO), U.S. Embassy, Nepal.

With Baman Kumar Ghimire, Motherland Secondary School, Pokhara, Nepal

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**November 9, 2019**  
 Greetings from Nepal,  
 Baman Kumar Ghimire  
 Teacher, Motherland Secondary School, Pokhara

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### Participant #1 (boy, grade 10)

(17 courses so far, mostly from Coursera): A Grade 10 student from a public school where English is taught only for about 3 hours a week. He simply jumps into any course he finds suitable and enjoys learning English.

From Coursera.org

1. English For Science, Technology, Engineering and Mathematics
2. Understanding Research Methods
3. What Future for Education?
4. Social Norms, Social Change I
5. Stanford Introduction to Food and Health
6. LaBrie and the Road
7. Power Onboarding
8. eHealth: More than just an electronic record
9. Improving your statistical inferences
10. Global Health Policy
11. English for Media Literacy
12. Code Yourself an Introduction to Programming
13. Behavioral Finance
14. English For Journalism
15. Teach English Now Teaching Language Online
16. Creative Thinking: Techniques and Tools For Success
17. Economic Growth and Distributive Justice Part 1: The Role of the state
18. Transmedia Storytelling: Narrative Worlds, emerging technologies, and global audiences
19. Introduction to Psychology
20. Neuroscience and Neuroscience: Part I
21. Assessment For Learning
22. Big History: Connecting Knowledge
23. The Science of Open Cities

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### Participant #2 (girl, first MOOC age 10)

(first MOOC at the age of 10. The list includes only those courses she completed during the pandemic. She has been taking 4 hours classes from school every day for the last 5 months).

1. Ideas for better world: leading change through policy making
2. Introduction to psychology: Biological
3. Introduction to psychology: Learning
4. What is a network?
5. Behavioral Economics
6. Social norms I: Elementary
7. Social Change: How can marketing help?
8. Diagnosing pandemics and pandemics: are you ready?
9. Digital Skills: Social Media
10. Introduction to Conversational Interfaces
11. Introduction to Creative AI
12. COVID-19: Disease Mapping in times of crisis
13. Introduction to Psychology: Health and Well-being
14. Managing mental health and stress
15. Future-proofing the health workforce
16. COVID-19 helping young people
17. Powering your work with impact
18. Collaborative Working in Remote Teams
19. Essential skills for career development
20. Creating a social media marketing campaign
21. How to make great online content?
22. Learning to Code for Web
23. Get creative with people
24. Computer programming with everyone
25. COVID-19 Tackling the most common virus
26. Indirect evidence: essential knowledge for business

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### Participant #3 (teenage girl)

(This is the girl who is seen in your promo page. She comes from the area that experiences very low internet connectivity.)

1. Plagues, witches, and war: The worlds of historical fiction.
2. English for stem
3. Wonders of ancient Egypt
4. Introduction to programming and animation with Alice
5. Tricky English Grammar
6. Creative writing: The craft of plot
7. Greek and Roman mythology
8. English for career development
9. The science of well being

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**November 9, 2019**

**Chapter 9. Nepali High School Students in Massive Open Online Courses (MOOCs): Impressive Results and a Promising Future**  
**Baman Kumar Ghimire and Bishwa Raj Gautam**

**Greetings from Nepal**

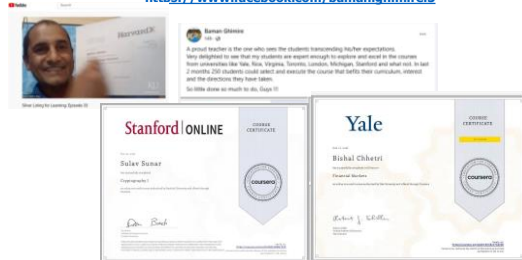
**Baman Kumar Ghimire**  
Teacher, Motherland Secondary School, Pokhara



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**December 20, 2022**  
**Baman Ghimire**

<https://www.facebook.com/baman.ghimire.3>



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### All Participants of the Study

- ✓ Convenient sampling
- ✓ Recruitment: contact teacher
  - Nepali **students** who took and **completed at least one MOOC**.
  - Nepali **teachers** who **used MOOCs in their teaching**, and whose students took and completed MOOCs.



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## Data Collection Background

### Student Interviews

- ✓ Total #13
- ✓ Semi-structured
- ✓ 7 female
- ✓ 6 male

### Teacher Interviews

- ✓ total #7
- ✓ Semi-structured
- ✓ 4 female
- ✓ 3 male

### Student Focus Groups

- ✓ total #2
- ✓ Semi-structured
- ✓ total 8 students



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## Research Questions

Methods: Teacher's Perspective

1. **What scaffoldings and environmental cues** were provided by teachers to support Nepali adolescent in enrolling and succeeding in MOOCs?
2. **What are Nepali teachers' perspectives** on using MOOCs as supplementary resources?



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## Participants

Participant	Job title	Years of using MOOCs	School Type	Number of Students Completed MOOCs
Teacher #1	Science Teacher	4 years	Private	15-20
Teacher #2	EFL Teacher	7 years	Private	more than 20
Teacher #3	EFL Teacher, Principal	3 years	Private	more than 20
Teacher #4	EFL Teacher	1 year	Private	more than 20
Teacher #5	EFL Teacher	1 month	Public school; ACCESS	2 completed
Teacher #6	EFL Teacher	1 month	Public school; ACCESS	2 completes
Teacher #7	EFL Teacher, Principal	8-9 years	Private	more than 20



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## Identified Themes

Sources of support | parental; teacher's fading support; external support

Teacher roles | facilitators, guides, cheerleaders

Substantial gains | teachers learning from MOOCs, benefits, positive outcomes

Strategies &amp; student initiatives | student mentors, intrinsic sources, incentives

Challenges &amp; suggestions | engaging with courses, resources, design



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## RQ 1

Sources of support | parental; teacher's fading support; external support

**"They did on their own pace but initially we guided them, initially we guided them and every week what we follow up them initially but later on they did by themselves."** (T#1, line-134-136)

**"...the school has been promoting these kinds of activities, please, to let your children be with the computer. If they ask for, and it was really very difficult to convince the parents as well."** (T#3, line 390-396)



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## RQ 1

Strategies &amp; student initiatives | student mentors, intrinsic sources, incentives

**"Those students who just completed MOOC, they are really happy got excited here they are leading the group and they are sharing their experience."** (T#4, line 588-591)

**"They have shown interest in coding, and they have started now they're running coding Club in school. And they mentor the junior those who did coding courses and now mentoring the juniors they're supporting the juniors."** (T#1, line 259-263)

**"...they were quite interested, they showed their motivation in doing the courses, so we didn't have to push them. You know, they were like motivated internally..."** (T#4, line 283-286)



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*"My life changed....(MOOCs) opened my eyes for a whole new field of learning."*

*"I'm learning something not included in the regular (school)."*

*"Learning can never be stopped."*



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## Study #2: Self-directed language learning in Duolingo



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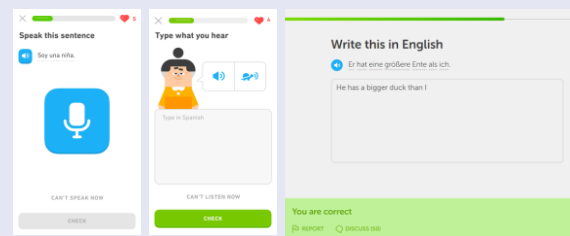
Most popular language studied on Duolingo in each country in 2021



(Blanco, 2021)

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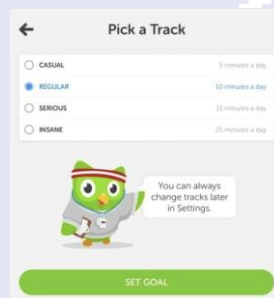
## Platform Overview



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## Goal Setting

- Based on microlearning.
- Is goal-oriented.
- Range from 5 min/day to 20 min/day.
- Flexibility to personalized.
- Teachers may track students' performance if use "Schools"

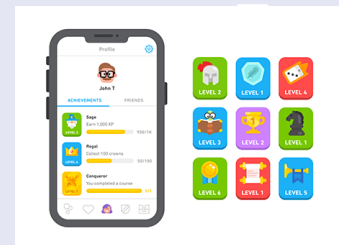


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## Gamification

Duolingo applies **gameful learning** to keep the learner motivated and consistently engaged in a positive and casual learning environment.

Its learning process is structured as a learning game that has game features, such as **reward, badges, and leader-board**, to allow users to learn as playing.



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## Research Questions

- How do Duolingo learners self-manage their learning goals, time, resources, and support?
- What strategies are employed by Duolingo learners to overcome challenges and frustrations related to learning foreign languages with Duolingo?
- What motivating factors underpin the decisions of learners to learn a foreign language with Duolingo?
- How does the design and delivery of Duolingo foster learners to be self-directed learners?

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## Context of the Study

- Learning with technology (e.g., Duolingo) in an out-of-classroom context is often challenged by the **absence of instructors and lack of guidance**.
- Therefore, it **demand[s] a much higher level of self-directed learning (SDL)** ability for the learners to be successful.
- White (1995) suggests that learners need to have strong **independence, autonomy, and control** to self-manage learning and make their own decisions in distance language learning.

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## Garrison's (1997) Framework of SDL

- **Self-management** is the task control ability that is associated with external activities, such as time, resources, and goal management.
- **Self-monitoring** is the cognitive and metacognitive process of establishing learning strategies and learning paces.
- **Motivation** can initiate and sustain learning efforts towards cognitive goals (Garrison, 1997).

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## Study Design

The **10 research participants** represented a wide range of age and ethnic groups.

Participants of this study were screened and identified through the previous survey that was distributed through the Duolingo forum, an online language community using Discord, as well as through postings on Facebook pages, emails, and WeChat groups. The interviewees' demographics are listed in Table 1.

Table 1. Duolingo Interviewees Demographic and Language Learning Information

Interviewee	Gender	Country	Native Language	# of years using Duolingo	Language learned through Duolingo
P1	M	Mexico	Spanish	More than 7 years	English, French
P2	M	United States	English	1 - 3 years	Japanese
P3	F	China	Chinese	Less than 6 months	Japanese
P4	F	China Main	Spanish	6 months - 1 year	Portuguese
P5	F	China	Chinese	1 - 3 years	French
P6	F	Indonesia	Indonesian	6 months - 1 year	French, German, Spanish
P7	M	Germany	German	6 months - 1 year	Chinese
P8	F	United States	English, French, Spanish	6 months - 1 year	African
P9	M	United Kingdom/Singapore	English	6 months - 1 year	Chinese, Indonesian, Spanish
P10	F	Singapore	Malay	Less than 6 months	Japanese

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## Goal Management

- **Goals specify the amount of effort required to succeed and the self-satisfaction anticipated** (Schunk, 1990).
- Goal setting leads to task assessment and considerations of the appropriate learning strategies from a metacognitive perspective (Ridley et al., 1992).
- In MALL, timescales influence the dynamic nature of the learning ecology and so influence the learning goals.
- **Setting realistic and achievable goals is more likely to lead to a successful SDL.**

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## Self-management

- Specific **goals** can lead to improved performance, and learners' learning goals can be self-initiated or technology-defined.
- Distractions from daily living may make **time** management difficult, both physically and psychologically.
- **A single MALL tool like Duolingo is not enough to master a language in all dimensions**; as a result, they seek and manage other **resources** to complement their learning.
- Both human and material **resources** can be used to complement Duolingo learning.

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## Self-management



Interviewee #2

"I think my biggest suggestion, as I mentioned a little earlier, is just don't use Duolingo as your only resource. Because particularly nowadays or for any language, there are so many other resources out there and there are certain things that each of them does better or worse than the others."

"My opinion on that is since Duolingo is a non-human system, I think to have a human tutor at the end of a section would actually be a nice relief, a nice change of pace."



Interviewee #9

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## Time Management

- The majority of interviewees (n=8) stated that **daily life activities** are a constraint to their **time management**.
- The significant obstacle is due to **work demands**, which have an impact on learners' physical and emotional ability to complete their learning goals on a consistent basis.

"Because my schedule can be busy. Sometimes, especially during the exam period in schools, I really have **no time**. I'm just busy completing my markings."

Interviewee #10



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## Finding: Motivation

Language learners are mostly driven by intrinsic motivators that relates to culture, travel, and brain training.

Q3. What motivated you to learn a foreign language?



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## Finding: Motivation

- The idea is that I would really like to go to Europe someday. (P5)
- So in the last month, the idea came up of going from Hamburg with the train to Moscow and then transit to the trains. And then make some stops in Siberia and then end at Beijing and enjoy the visit in China. (P7)
- But for people, who are more like my mother, when she talks about it, she is just like, "oh, well, I'm learning it. I don't expect to be conversational and I'm just learning it to keep my mind sharp." (P8)



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## Finding: Self-monitoring

Most of the learners highly rely on the technology to support monitoring, such as reinforcing micro learning habits without extra effort and **maintaining learning process by receiving frequent practice reminders and notifications**.

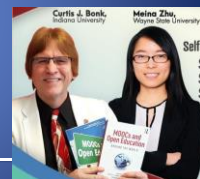
- And after you have chosen the wrong one and at the end of this lesson, the system will provide you with a repeated choice to make you make a choice again. (P3)
- And I don't actually see much about self-monitoring in the process. Because they have a clear structure, clear modules. Basically, you just tap in and go with it. (P5)
- I think when they come to self-monitoring, it is really lacking, because there's no little test that I can take, and "okay, I have progressed to this level." (P10)



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## Study #3 MOOCs Instructional Design to Facilitate Participants' Self-directed Learning

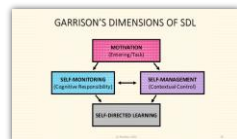


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## Key Terms

Self-directed learning (SDL) (Garrison, 1997)

- (1) self-management
- (2) self-monitoring
- (3) motivation



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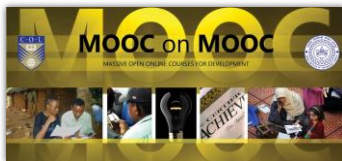
## Research Background

- **Learners need self-directed learning skills and strategies to be successful in MOOCs** (Halawa, Greene, & Mitchell, 2014; Littlejohn & Milligan, 2016), as there is a lack of personalized interaction with teachers.
- **Self-directness of a learner might vary in different learning environments which means that the learners could be more self-directed in one learning environment than another** (Hiemstra, 1994).

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## Research Purpose

- The purpose is to inform instructors or instructional designers and MOOC providers of the current practices of designing MOOCs to facilitate learners' SDL.



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## Research Design

Explanatory sequential mixed methods design

(Creswell & Clark, 2017)



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## Data Collections

### Survey:

- Volunteer sampling (Creswell & Clark, 2017)
- **198 instructors responded to the survey** (10% response rate)

### Interview:

- Homogeneous purposeful sampling (Creswell & Clark, 2017; Patton, 2002)
- Maximal variation sampling (Creswell & Clark, 2017)

### MOOC review:

- **22 interviewees**
- **Reviewed 22 interviewees' MOOCs**



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Pseudonym	Country	Subject area	Platform	Gender	No. of O/B	No. of M	Mode of the M
Lucas	US	Social science	edX	M	0	1	I without T
Brandon	US	Education	Udacity	M	0	5 or more	Self-paced
Logan	US	Literacy and Language	Coursera	M	5 or more	5 or more	I with T
Emma	US	Literacy and Language	Coursera	F	2	1	Self-paced
Jason	US	Science	edX	M	1	1	I with T
Jackson	US	Medicine and health	Coursera	M	5 or more	1	Self-paced
Sarnal	US	Education	FuturLearn	M	4	3	Self-paced
Hannah	US	Education	Blackboard	F	5 or more	1	I with T
Ashley	US	Education	EdX	F	0	5 or more	I with T
Andrew	UK	Art	FuturLearn	M	0	3	I with T
Emily	UK	Medicine and health	FuturLearn	F	2	2	I with T
Aiden	UK	Social science	FuturLearn	M	0	1	Self-paced
Henry	UK	Social science	FuturLearn	M	0	1	Self-paced
Joseph	UK	Medicine and health	FuturLearn	M	1	1	Self-paced
Joshua	UK	Literacy and language	FuturLearn	M	2	2	I with T
Mason	Australia	Education	Coursera	M	5 or more	1	I with T
Ethan	Australia	Business	Coursera	M	3	1	I without T
Ben	Australia	Social science	edX	M	1	1	I with T
Paul	France	Computer Science	Coursera	M	1	1	I with T
Fernando	Belgium	Research methods	Blackboard	M	5 or more	3	I with T
Jacob	Netherlands	Science	Coursera	M	0	1	I with T
Dylan	Israel	Science	Coursera	M	5 or more	3	I without T

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## Study #4

### MOOC Learners and SDL

Zhu, M., Bonk, C. J., & Berri, S. (2022). Fostering self-directed learning in MOOCs: Motivation, learning strategies, and instruction. *Online Learning*



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## Research Questions

1. What motivated individuals to enroll in MOOCs?
2. What were the learning strategies that helped learners' SDL in MOOCs?
3. What were the design and instructional elements of MOOCs that facilitated learners' SDL?

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## Study #4

### MOOC Learners and SDL

Zhu, M., Bonk, C. J., & Berri, S. (2022). Fostering self-directed learning in MOOCs: Motivation, learning strategies, and instruction. *Online Learning*

Table 1

Pseudonyms	Gender	Countries	Occupations
Abdolkhalam	M	Turkey	Teacher
Ali	M	Yemen	Student
Alina	F	The UK	Student
Betty	F	Albania	Engineer
Chang	M	Canada	Artist
Dan	M	Mexico	Professor
Helen	F	Indonesia	Administrative assistant
Jacob	M	The US	Retired management consultant
Janet	F	The US	Educator
Joe	M	The UK	Retired engineer
Melissa	F	Germany	Student
Monty	F	Egypt	Student
Sandy	F	The US	Student
Sarah	F	The US	Between jobs
Sophia	F	The Netherlands	Retired office manager

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## RQ1. Intrinsic Motivation

Jacob, a retired management consultant from the US, expressed his motive behind enrolling in MOOCs as strictly intrinsic, "there's no reward. **I'm retired. It's really just [that] I get very interested in topics. I realize holes in my knowledge and try to fill the holes.**"

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## RQ1. Extrinsic Motivation

Besides educational purposes, **some participants enrolled in MOOCs to help with their career development.** For example, Sarah, who received her Ph.D. degree and was in between jobs at the time, selected topics such as anatomy, MatLab software, oncology, biology, and neuroscience. Sarah explained the purpose for taking these types of MOOCs was:  
**To acquire and improve my knowledge as a medical physicist...I consider my resume when selecting MOOC. I choose courses related to my professional field to add them to my curriculum;** otherwise, there would be a period without being in contact with my profession.

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## RQ2. Learning Strategies

### RQ2: What were the Learning Strategies that Helped Learners' SDL in MOOCs?

Dan considered the progress bar to be a good indication of his progress, and it also created a healthy competition among the learners. Seeing where he was at in the course compared to the other learners gave him a push. He stated, "All the progress bar with milestones, with a small quiz that doesn't count for the evaluation, but they're good for you to check if I'm really learning. And, for example, I like when you have these kinds of nice competition[s], right. Everyone starts a MOOC at the same time, but you see that these weeks you progress faster than other members in the MOOC."

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### Top 10 Strategies to Facilitate SDL in MOOCs

1. Helping students set their own learning goals.
2. Building learning community.
3. Offering immediate feedback.
4. Embedding quizzes for self-assessment.
5. Providing progress indicators.
6. Providing reflection questions.
7. Designing short learning units.
8. Providing flexible timelines.
9. Highlighting estimated time frames.
10. Making available optional learning materials.



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### 15 Guidelines and Strategies for Fostering and Enhancing Self-Directed Online Learning

Zhu, M., & Bonk, C. J. (2022). Guidelines and strategies for fostering and enhancing self-directed online learning. *Open Learning: The Journal of Open, Distance and e-Learning*. DOI: <https://doi.org/10.1080/02680513.2022.2141105>

#### 15 guidelines for promoting SDL in MOOCs and similar large scale open education environments:

- (1) helping students set their own learning goals,
- (2) encouraging learners to make plans,
- (3) offering flexible timelines,
- (4) highlighting estimated time frames,
- (5) embedding tasks and activities to form a learning community,
- (6) supplying timely and constructive feedback,
- (7) embedding quizzes for self-assessment,
- (8) crafting visuals showing work progress and tasks completed,
- (9) providing reflection questions,
- (10) designing time-sensitive learning units,
- (11) making available optional learning materials and self-selection options,
- (12) creating a structured learning environment, including weekly overviews,
- (13) making sure that lectures are recorded with captions added,
- (14) inserting application exercises for putting the course material into practice, and
- (15) using gamification to support SDL.

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### #1. Helping students set their own learning goals

#### Set a weekly goal

Learners who set a goal are 75% more likely to complete the course. You can always change it.

☒ Learn 2 days a week Recommended

☐ Learn 3 days a week

☐ Learn 5 days a week

Your goal will be tracked Monday - Sunday

[Set goal](#) [Reset now](#)



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### #2. Encouraging learners to make plans

#### Set your schedule

✓ Your goal is set!

You're more likely to reach your goal if you dedicate some time in your schedule for learning. Choose the days that work for you:

Mo ☐ Tu ☐ We ☒ Th ☐ Fr ☐ Sa ☐ Su

Start time:  End time:

[Add to Google Calendar](#) [Other calendar](#)

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### #3. Offering flexible timelines

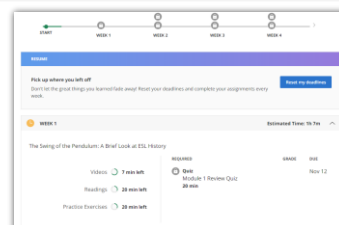
You've already completed 77% of your course! Reset your deadlines so you can finish the rest!

[Reset my deadlines](#)

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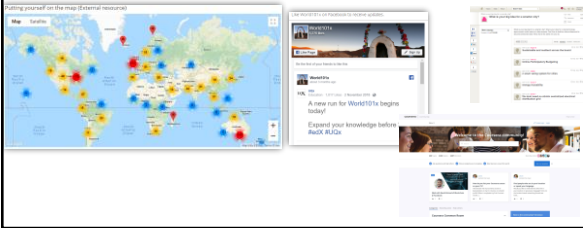
### #4. Highlighting estimated time frames



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## #5. Embedding tasks and activities to form a learning community



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## #6. Supplying timely and constructive feedback

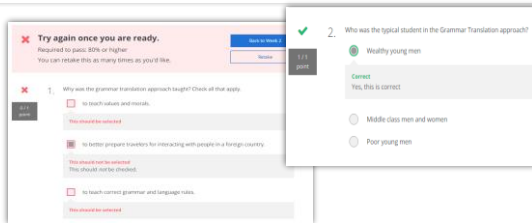
### Quiz

I had to delete the code for graph before I could get values for posterior\_Mean and posterior\_sd. Can't I get all values, and graph simultaneously. I first saw th...

Staff reply

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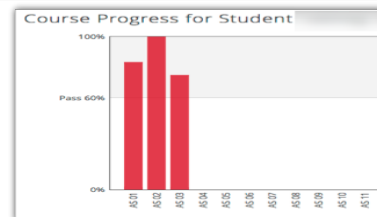
## #7. Embedding quizzes for self-assessment



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## #8. Crafting visuals showing work progress and tasks completed



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## #9. Providing reflection questions



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## #10. Designing time-sensitive learning units

- ✓ **Video:** Introduction to Regression 6 min
- ✓ **Video:** Introduction: Basic Least Squares 6 min

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## #11. Making available optional learning materials and self-selection options

- Reading: BASIC: A Blanket Around the Earth 10 min
- Reading: ADVANCED: A Blanket Around the Earth 10 min

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## #12. Creating a structured learning environment, including weekly overviews

### WEEK 1 - OVERVIEW & CONSIDERATIONS FOR STATISTICAL MODELING

2 min of videos left 47 min of readings left 1 graded assignment left

We begin this third course of the Statistics with Python specialization with an overview of what is meant by "fitting statistical models to data." In this first week, we will introduce key model fitting concepts, including the distinction between dependent and independent variables, how to account for study designs when fitting models, assessing the quality of model fit, exploring how different types of variables are handled in statistical modeling, and clearly defining the objectives of fitting models.

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## #13. Making sure that lectures are recorded with captions added



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## #14. Inserting application exercises for putting the course material into practice

### Week 3 Assessment

This chapter Notebook is linked to the following assessment in this week. To complete this assessment, you will complete the 5 questions outlined in this document and use the output from the python cells to answer them.

Run the following cell to initialize your environment and begin the assessment:

```
%%python init_notebook
import warnings
warnings.filterwarnings('ignore')

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

# Set random seed
np.random.seed(123)

# Load dataset
data = pd.read_csv('data.csv')

# Drop unused columns, drop rows with any missing values
data = data[['X1', 'X2', 'X3', 'X4', 'X5', 'X6', 'X7', 'X8', 'X9', 'X10', 'X11', 'X12', 'X13', 'X14', 'X15', 'X16', 'X17', 'X18', 'X19', 'X20', 'X21', 'X22', 'X23', 'X24', 'X25', 'X26', 'X27', 'X28', 'X29', 'X30', 'X31', 'X32', 'X33', 'X34', 'X35', 'X36', 'X37', 'X38', 'X39', 'X40', 'X41', 'X42', 'X43', 'X44', 'X45', 'X46', 'X47', 'X48', 'X49', 'X50', 'X51', 'X52', 'X53', 'X54', 'X55', 'X56', 'X57', 'X58', 'X59', 'X60', 'X61', 'X62', 'X63', 'X64', 'X65', 'X66', 'X67', 'X68', 'X69', 'X70', 'X71', 'X72', 'X73', 'X74', 'X75', 'X76', 'X77', 'X78', 'X79', 'X80', 'X81', 'X82', 'X83', 'X84', 'X85', 'X86', 'X87', 'X88', 'X89', 'X90', 'X91', 'X92', 'X93', 'X94', 'X95', 'X96', 'X97', 'X98', 'X99', 'X100']]

# Drop unused columns
data = data[['X1', 'X2', 'X3', 'X4', 'X5', 'X6', 'X7', 'X8', 'X9', 'X10', 'X11', 'X12', 'X13', 'X14', 'X15', 'X16', 'X17', 'X18', 'X19', 'X20', 'X21', 'X22', 'X23', 'X24', 'X25', 'X26', 'X27', 'X28', 'X29', 'X30', 'X31', 'X32', 'X33', 'X34', 'X35', 'X36', 'X37', 'X38', 'X39', 'X40', 'X41', 'X42', 'X43', 'X44', 'X45', 'X46', 'X47', 'X48', 'X49', 'X50', 'X51', 'X52', 'X53', 'X54', 'X55', 'X56', 'X57', 'X58', 'X59', 'X60', 'X61', 'X62', 'X63', 'X64', 'X65', 'X66', 'X67', 'X68', 'X69', 'X70', 'X71', 'X72', 'X73', 'X74', 'X75', 'X76', 'X77', 'X78', 'X79', 'X80', 'X81', 'X82', 'X83', 'X84', 'X85', 'X86', 'X87', 'X88', 'X89', 'X90', 'X91', 'X92', 'X93', 'X94', 'X95', 'X96', 'X97', 'X98', 'X99', 'X100']]
```

Question 1: What is obtained data? (You'll answer this question within the quiz that follows this notebook)

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## #15. Using gamification to support SDL

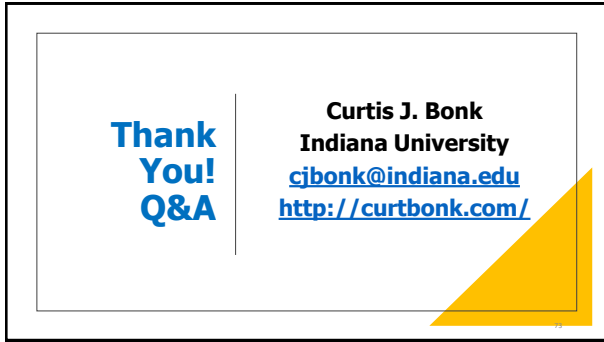


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Zhu, M., & Bonk, C. J. (2022). Guidelines and strategies for fostering and enhancing self-directed online learning. *Open Learning: The Journal of Open, Distance and e-Learning*. DOI: <https://doi.org/10.1080/02680513.2022.2141105>



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**Thank  
You!  
Q&A**

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A yellow triangle is located in the bottom right corner of the slide content area.

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