

The use of social media in the creation of personal learning environment during the #studyfromhome period

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ABSTRACT

Due to the Covid-19 outbreak in Indonesia the Government urged students and lecturers to conduct the learning process from home through an online system called #studyfromhome. The architecture undergraduate students in this study were millennial students who used digital technology on a daily basis. This study was conducted to determine the role of social media, as well as millennial students' preferences and feedback on the use of social media as learning tools to create a personal learning environment (PLE). Questionnaires were distributed online to students of Class of 2017 and 2018, out of whom 115 respondents provided their feedback. The results of the study showed that the students of the Architecture Study Program at Udayana University in Bali were fond of using social media especially audio-visual applications for learning activities. In addition, very positive feedback was also provided in terms of knowledge sharing and creativity, acquisition of information, and submission of assignments. Social media were considered more student-friendly. This condition was relevant to the characteristics of the millennial students who were independent learners, and facilitated the creation of PLE. Dealing with the new approach, the students hoped that social media could be used in a better manner as architecture learning platforms.

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1. INTRODUCTION

When the Covid-19 pandemic reached Indonesia, the government made the #studyfromhome appeal to all schools and universities throughout Indonesia. The appeal, which was enforced on 16 March 2020, was expected to flatten the curve of the rapid transmission of Covid-19. Hence, online learning became the only option to carry out the learning process safely from home. Various social media, such as WhatsApp, YouTube, Zoom, Webex, Facebook, Instagram, Line, Telegram, and others, began to be used effectively as learning tools. Digital technology and its derivatives are rapidly developing to bridge the gap between space and time in distance learning activities between learners and teachers.

Digital technology in teaching and learning activities at universities has long been widely used in the 21st century. This technology-based education is highly relevant to the characteristics of the younger generation whose learning styles are different from previous generations. The students of this generation are classified as a 'millennial' generation, or 'Gen Y', who were born between 1980 and 2000 [1, 2]. The

millennial generation is considered a ‘digital native’ generation because they have been familiar with technology since their childhood [3]. This generation is tech-savvy, and they have a high dependency on digital technology [4].

The development in student literacy attached with advanced technology has emerged the increase of digital technology in education [5]. The rapid development of digital technology presents its own challenges for teaching staff in the learning process. Students’ learning styles also change, resulting in differences in values, perspectives, and approaches between generations. The millennial generation expect to be involved in their learning and being active learners by digital technology [5], so the lectures must have digital learning platform, include the smart phones, laptop, computers and the internet. Besides digital devices, learning process in architecture education not only needs average computer programs, but it is supported by specific software, namely AutoCAD and Sketchup. Interestingly, students have been simultaneously motivated by using digital technology, particularly using modelling and Computer-Aided Design (CAD) technology in the process of design [6]. Changes in the meaning of learning in the mindset of millennial learners in the higher education environment will result in changes in mindset and action patterns in the climate and learning environment to answer the challenges of the times [7]. The challenges faced by higher education today are student learning styles and lack of enthusiasm of lecturers in utilizing technology as a learning tool [8]. In addition to that, there is a wide gap between senior lecturers and millennial students [9]. The incompatibility between lecturer teaching styles and student learning styles may cause decreased student interest in learning, which may lead to a lack of self-confidence [10].

To understand the characteristics of millennial students, there are four main characteristics of millennial generation students: Innovation; Investigation; Immediacy; and Authentication and Trust [10]. Table 1 illustrates these four characteristics with the additional characteristic of ‘Social Consciousness’ as referenced from a number of other studies.

Table 1. Characteristics of millennial students

Main characteristics	Black (2010) [11]	Noor (2016) [10]	Suh and Hargis (2016) [12]
Innovation		<ul style="list-style-type: none"> ▪ The use of technology at a higher level 	<ul style="list-style-type: none"> ▪ Aesthetic aspect in the presentation of course materials
Investigation		<ul style="list-style-type: none"> ▪ Curiosity, discovery, and exploration 	<ul style="list-style-type: none"> ▪ Curiosity and exploration
Immediacy	<ul style="list-style-type: none"> ▪ Demanding, impatient, and less focused 	<ul style="list-style-type: none"> ▪ Constantly keep up with the development of cyberspace information 	
Authentication and trust	<ul style="list-style-type: none"> ▪ Digital native 		
Social consciousness	<ul style="list-style-type: none"> ▪ More open and confident ▪ Tend to work in groups and show teamwork ▪ Have high tolerance and respect for differences ▪ Have networks outside the geographical area ▪ Share the values that are instilled by their family and community 		

On the other hand, this generation gap also provides interesting opportunities for lecturers to engage students in different ways. Lecturers can get higher class participation and longer student attention, and build interaction with students if they make class presentations using technology, such as online videos and Power Point slides [13]. Another study also found that students would be more interested in class assignments related to and requiring digital technology [14]. Digital technology on smartphones can also be used to find out feedback from students quickly [1, 13]. Mobile learning by utilizing gadgets is a very effective choice because students commonly use mobile devices [15].

Connections with digital technology can make the learning process more efficient and more accessible to students [4], thus creating an affinity space that is suitable for the place where the learning activities take place [16]. The affinity space offers a new approach in learning methods facilitated by various technologies, such as social media including WhatsApp, YouTube, Telegram, Twitter, Facebook and Instagram. Social media are defined as various network technology tools that emphasize on the social aspect of the Internet as a channel for communication, collaboration, and creative expression [17].

Millennial students use social media to share information, create social networks outside their geographical reach, seek new knowledge, share academic activities, and other things they learn in college

[18, 19]. They are “active content co-producers” [18] and have become part of the international virtual community [18]. Due to their extensive network and unlimited content, social media can be used for academic discussion activities outside classrooms [20]. The use of social media can facilitate the creation of a Personal Learning Environment (PLE), and thus, social media have become a system that can help millennial students control and manage their own learning [18, 20], as shown in Table 2.

Table 2. How social media facilitate the creation of PLE

Previous researchers	PLE creation method
Blaschke (2014) [21]	<ol style="list-style-type: none"> 1. Promote self-potential and develop abilities for the creation of PLE. 2. More self-directed learners. 3. The uniqueness of the learning activities that affects meta-cognition skills: <ol style="list-style-type: none"> a. Construct new knowledge b. Formulate learning contents c. Understand the learning process individually
Dabbagh and Kitsantas (2012) [18]	<ol style="list-style-type: none"> 1. Share knowledge with everyone in social networks 2. Participate in building collective knowledge 3. Manage the process of building individual knowledge

In addition to facilitating a learning environment outside the classroom, social media also offer the millennial generation diverse benefits for learning, as described in Table 3.

Table 3. The benefits of social media for millennial learning

Previous researchers	Benefits of social media in learning
Blaschke (2014) [21]	1. Social media are used to support learning activities and the learning process itself.
Coleman (2013) [22]	1. Enable students to have freedom to have connections and collaborate off campus to gain practical knowledge in the world of work
Dabbagh and Kitsantas (2012) [18]	<ol style="list-style-type: none"> 1. Enable students to search for information and share information/knowledge. 2. Allow students to participate in knowledge sharing collectively and manage individual knowledge.
Hussain (2012) [19]	<ol style="list-style-type: none"> 1. Facilitate exchange of academic activities, sharing of learning experiences, and development of social networks. 2. Facilitate collaboration and accessibility to develop virtual communities across countries.
Rahimi, van den Berg and Veen (2013) [23]	1. Enable students to have the opportunity to manage the learning environment or become an independent learner.
Greenhow and Robelia (2009) [24]	1. Fulfill the social function of learning which penetrates the spaces of activities for the learner.
Kurkela (2011) [25]	1. Social media related to competency development are more important for independent learners.

Through social media, the visual aspect of millennial learning can be optimized. The millennial generation are visual learners because they prefer reflective learning styles and visual learning compared to other generations [26, 27]. This includes learning by reading graphs and diagrams, thinking in pictures, and making illustrations [10]. Millennial students absorb visual information better than information provided using conventional approaches in the form of texts and lectures [28]. They are also more adept at visual presentation techniques [11], and that is why the millennial generation is classified as visual learners [29].

In response to the development of the 21st century's higher education, the #studyfromhome period at Udayana University was an early milestone in the use of digital technology as an intensive architectural learning tool. Social media are the right choice and are relevant with millennial students' learning styles. In the past, social media were not used optimally as learning platforms by architecture lecturers and students. Therefore, it was necessary to conduct this research to evaluate the teaching-learning process during the Covid-19 pandemic. This study analyzes the feedback provided by millennial students in connection with their learning experiences on the effectiveness of the use of social media as architectural learning tools during the #studyfromhome period. This research revealed the role of social media, millennial students' preferences and feedback on the use social media as learning tools for discussions and assignment consultations, as well as presentations and submission of assignments, for both theoretical and architectural studio courses.

2. RESEARCH METHOD

2.1. Research design

This research was designed with a mix-method approach. In the classroom research, the student quantitative data were collected by distributing the Likert scale questionnaires, while the qualitative data

were collected through structured interviews and a number of open-ended questions on the questionnaire [30]. The students were given an opportunity to describe their learning experiences during the #studyfromhome period to gain more insights on their opinions, hopes, and aspirations. The questionnaires were developed to identify the respondents' preferences and the role of social media, while open-ended questions allowed for feedback from the respondents, especially on their attitudes towards the use of social media in architectural learning.

The questionnaires in the form of Google Forms were distributed to the respondents through a link sent via WhatsApp. The data collection process was conducted for two weeks starting from 15 June 2020 or during the implementation of the Final Semester Examination after all lecture learning activities for the Even Semester of the Academic Year 2019-2020 had been completed. Students had enough time to experience and reflect on their learning activities on the whole, which included online lectures, preparation, assignment completion, and post-assignment submission. Interviews were conducted via voice calls. Both types of data were analyzed statistically and interpreted qualitatively.

2.2. Questionnaires

The questions for the questionnaires were prepared based on the purpose of the study. The questionnaire was prepared by referring to a number of previous studies. The themes and question variables are presented in Table 4.

Table 4. Linkages among themes, variables and survey activities

Themes	Variables	Survey activities
Student learning characteristics	<ul style="list-style-type: none"> ▪ Innovation ▪ Investigation ▪ Immediacy ▪ Authentication and trust ▪ Social consciousness 	Online questionnaires
Creation of student PLE through social media	<ul style="list-style-type: none"> ▪ Promote self-potential ▪ Develop the ability to create PLE (self-directed learners) ▪ Construct new knowledge through learning content ▪ Participate in building collective knowledge by sharing knowledge through social networks 	
Learning activities	<ul style="list-style-type: none"> ▪ Read information presented in tables, schemes, and pictures ▪ Use search engines to search for information ▪ Look for inspiration from existing architectural works through online simulations ▪ Read textbooks (theories, concepts, nonfiction content) ▪ Interact with computer simulations ▪ Listen to lectures through video recordings and video conferencing ▪ Conduct discussion and present individual and group assignments to lecturers through social media ▪ Online learning evaluation system 	
Preferences in the use of social media The benefits of social media in learning	<ul style="list-style-type: none"> ▪ Social media tools that are suitable for theory class learning ▪ Social media tools that are suitable for architectural studio activities ▪ Support learning activities and processes ▪ Provide ease in interacting with other architecture students or using other learning resources off campus globally ▪ Search for and share information faster and more extensively ▪ Support collective knowledge building and individual knowledge management (independent learners) ▪ Promote competencies and learning outcomes to the wider communities 	

(Source: Formulated from the relevant studies, 2020)

2.3. Respondents

The respondents of this study were Architecture Study Program students of Class of 2017 and 2018. The students of both classes were born in the year between 1998 and 2000 or aged 20 to 22 years, and can be categorized as Millennial Generation. Class of 2019 was not chosen as respondents because they had insufficient learning experience in architecture compared to the previous classes, which made their critical thinking and problem-solving skills less developed. Class of 2016 was not selected either because most of them were taking an Architecture Studio Final Assignment. The number of respondents who were willing to fill out the questionnaire was 115 students.

2.4. Research constraints

Because the research subjects are students of architecture, the findings of this study are only relevant for architecture learning. In the future, similar research can be conducted on Generation Z.

The use of social media in the creation of personal learning environment during ... (Ni Ketut Agusintadewi)

3. RESULTS AND DISCUSSION

3.1. Students' preferences in the use of social media for learning activities

The data collected from the questionnaire showed that of the 115 respondents who provided feedback, 49% were women and 51% were men, with the majority or 58% aged 20 years, as shown in Figure 1. The data on the respondents' age showed that 85% of the respondents were in the category of the millennial generation with an age range of 20-22 years or a birth year of 1998–2000.

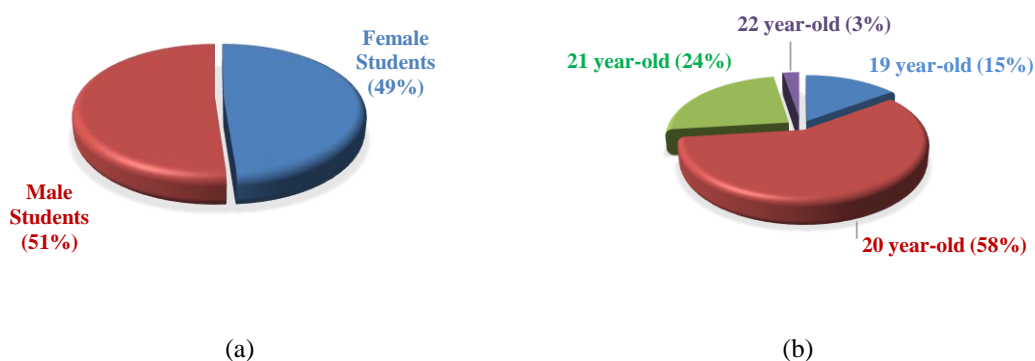


Figure 1. Distribution of respondents providing feedback
(a) Gender distribution; (b) Age range

Figure 2 shows that 54% of the respondents gave a score of 5 (Love it), 32% gave a score of 4 (Like it), and 14% gave a score of 3 (Neutral). None of the respondents gave a score of 4 (Dislike it) or 5 (Dislike it very strongly). This finding shows that millennial students have a high preference (around 86%) for using social media in learning activities and like this approach. This high preference reflects the characteristics of the millennial generation that are highly dependent on digital technology [3, 4].

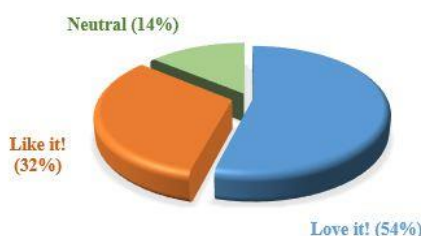


Figure 2. Millennial students' preference in using social media

As many as 66.4% of the millennial students said that social media was beneficial for them, especially in searching for and sharing information faster and more extensively, supporting learning activities, and enabling students' freedom to interact with other learning resources outside the campus, as shown in Table 5.

Table 5. The benefits of social media for millennial learners

Benefits of social media	Percentage
1. Support learning activities	21.6
2. Provide freedom to interact with other architecture students or other learning resources outside the campus	16.6
3. Enable faster and more extensive information searches and sharing	28.2
4. Support collective knowledge building and individual knowledge management (independent learners)	8.3
5. Facilitate social network building in the field of architecture globally	11.7
6. Promote students' competencies and learning outcomes to the wider communities	13.6

Of all the applications used, WhatsApp, Line, and Instagram are the most widely chosen tools for architectural learning. The reasons cited varied widely, but most respondents agreed that these social media applications were commonly used, and made it easy for them to interact and share information in the form of text, graphics, audio and video, both between individuals and within groups. In addition, most students acknowledged that they had been using social media since junior high school. This is consistent with the characteristics of the millennial generation who are very familiar with digital technology, even from an early age [4].

3.2. The role of social media in the creation of personal learning environment for millennial students

As commonly known about the millennial generation, Table 6 describes that 31.4% of the respondents stated that social media were able to encourage students' abilities to be self-directed learners and 22.6% acknowledged that the use of social media was able to help construct new knowledge relevant to the learning content. This condition was triggered by the social media's capacity to share knowledge and information from individuals to a wider social network (19.4%), thus allowing the respondents to participate in building collective knowledge (15.1%). This atmosphere is very much needed for the creation of PLE among millennial students as independent learners in controlling and managing their learning activities [18, 21].

Table 6. The role of social media in the creation of PLE

The role of social media	Percentage
1. Promote students' self-potential	7.0
2. Develop students' abilities as self-directed learners	31.4
3. Enable students to construct new knowledge through learning content	22.6
4. Enable students to participate in building collective knowledge	15.1
5. Enable students to motivate themselves and share individual knowledge within social networks	19.4
6. Other: Act as a window to information	4.5

Table 7 shows four learning activities that are most frequently done by millennial students, namely interacting with computer simulations (18.3%), seeking inspiration from architectural works through social media (16.4%), using search engines to search for information (15.5 %), and listening to lectures through video recordings and video conferencing (15.4%). This finding shows that millennial students are visual learners, and for this reason conventional learning activities, such as reading textbooks, become less interesting [29]. In the case of architecture students, visual learning is more relevant and attractive to millennial students.

Table 7. Most frequently done learning activities

Learning activities	Percentage
1. Read information presented in tables, schemes, and pictures	7.1
2. Use search engines to search for information	15.5
3. Look for inspiration from existing architectural works through social media	16.4
4. Read textbooks (theories, concepts, nonfictions)	5.3
5. Interact with computer simulations	18.3
6. Listen to lectures through video recordings and video conferencing	15.4
7. Consult on assignments with lecturers through the online system	8.1
8. Present individual and group assignments to lecturers through social media	6.4
9. Discuss architectural studio assignments within the assignment cluster through social media	7.4
10. Online learning evaluation system	7.2

The social media that best suit the learning needs of theoretical courses are those that provide chat and voice call facilities (WhatsApp, Line), data transfer facilities (WhatsApp, Line), video call facilities (WhatsApp), and video conferencing facilities (Zoom, Webex). Meanwhile, the applications most suitable for architectural studio learning needs are those through which students can share presentation data with fellow group participants, such as Zoom and Webex (for two-way communication), as well as Instagram and YouTube (for one-way communication).

3.3. Students' feedback on the use of social media for learning activities

After familiarizing themselves with social media, most of the students stated that they experienced an increase in Social Consciousness. As many as 22.6% of the respondents acknowledged having high tolerance and respect for differences, 22.3% stated that they had a social network outside their geographical area, and 17.6% acknowledged that they were able to share the values instilled by their family and community. This is shown in Table 8. These findings confirm the characteristics of the millennial generation who tend to be more open, flexible, and willing to share with a wider network, without being limited by space and time [10].

Table 8. The benefits of social media in increasing social consciousness

Social consciousness	Percentage
1. Become more open and self-confident	13.1
2. Tend to be in groups rather than being alone	8.4
3. Have high tolerance and respect for differences	22.6
4. Have social networks outside their geographical area	22.3
5. Tend to collaborate with others rather than working alone	7.6
6. Increase their inner spirituality	6.2
7. Share the values that are instilled by their family and community	17.6
8. Other: Tend to be individualistic	2.2

Through the Word Cloud application, the frequency of words used in the respondents' additional comments can be generated as shown in Figure 3. Based on the Word Cloud, the terms most frequently mentioned by the students were learning, audio-visual media, information sharing, new approach, fun, challenging, and interesting. In general, the frequency of these words reflects positive feedback from millennial students about their experiences using social media as platforms for architectural learning.



Figure 3. Frequency of word usage

Student feedback can be grouped into various preferences for the use of social media in architectural learning activities. Table 9 lists significant comments from each of these reason groups. This finding is consistent with the characteristics of millennial students, technological dependence, and the ways in which social media help learning activities. Appreciation of student knowledge and sharing of creativity through the collection of assignments on social media are in accordance with the role of students as content creators or influencers to members of their online networks [18, 19]. Some students acknowledged that they appreciated the positive feedback from their online followers for the creative content they had shared. They were also enthusiastic about the idea of using social media as a new and interesting approach in education. This further confirms their characteristics as innovative and inquisitive digital-native generation, fast learners [10]. On the other hand, having access to digital devices and internet almost all the time has also led digital learners to always determine for quick answers rather than longer problem-solving. Students may come to be in countless sets of information, but they have been able to sort the information obtained into useful data. This relevant to the characteristics of millennial students is used to getting instant information on almost anything

from the internet that they are inclined to look for shortcuts without seriously considering neither the reliability of the information they get nor the ethicality of their conduct [31].

In addition, the student feedback on the acquisition of knowledge and understanding supports the idea that the use of social media can help in the creation of student PLE [18, 21]. Students become better at understanding course material when interacting with assignments online, so that they experience cognitive processes, visual understanding, and constructive feedback from others. This is consistent with the characteristics of millennial students as visual learners who learn more efficiently through online applications [10].

The use of social media as platforms for collecting assignments is considered to be more student-friendly because it saves more money and time. This approach using social media is also convenient for students because they can learn in their own affinity space [16], anytime and anywhere they have access to online networks. Social media have become part of their daily lives, so this approach can be a supportive method in architecture learning for big classes with more than 20 students. Nevertheless, using social media as a learning platform should be effectively blended with class lectures and presentations for small classes. Digital learning, therefore, must be inevitably applied and developed for millennial students in higher education, as the Covid-19 health protocol suggested. With the right and convenient method, lecturers can spark the interest of the 21st century's students, so that students' intentions and efforts to learn can emerge naturally.

Table 9. Selected feedback of the respondents

Reasons	Quantity of feedback	Selected feedback
Sharing of knowledge and creativity	27	<ul style="list-style-type: none"> I can share information to the public on social networks Instagram is the platform most suitable for students to find design inspirations in completing architectural studio assignments Social media are very easy to access and students can share the outcome of their assignments to their classmates. Students can share their best architectural works on their networks on Instagram.
New method of teaching	23	<ul style="list-style-type: none"> It is fun and easily accessible by anyone, so that anyone can learn from a different space, time, scenario, and perspective. It is a new method at the Architecture Study Program of Udayana University and, therefore, lecturers and students are challenged to be more creative. My friend overseas is also doing e-learning; it feels like I am studying abroad. I prefer that evaluations are carried out through social media platforms to written tests.
Acquisition and understanding of information	15	<ul style="list-style-type: none"> For me, this is an easy way to review assignments, so it will be easier to remember the lecture material. It increases my understanding of the course material. This way of teaching should be maintained. It's easier for students to do learning activities because they are already familiar with digital technology. Exploration of ideas for architecture students will be easier to do because information from all over the world can be obtained easily.
Ease of submitting assignments	12	<ul style="list-style-type: none"> It's cheaper, no cost is needed to print assignments. It's more student-friendly, easy to access and use, more exciting. It combines technology and education. It's environmentally friendly, paperless. Using technology and the Internet makes it easier to complete assignments compared to using conventional methods.
Intensity of social media use by the millennial generation	12	<ul style="list-style-type: none"> The use of social media is very suitable because almost every student has an account, not only for sharing photos, but also for sharing information. I like this approach because it's a combination of innovation and the latest trends. Millennials should have a social media account and use this platform to connect with others. It's the most appropriate way to contact students through social media applications that are commonly used by them, wherever they are.

4. CONCLUSION

Most millennial students prefer the use of social media as learning platforms, especially for completing tasks that require creativity, because the learning process becomes more innovative and interesting, makes it easier to understand knowledge, and saves more time and money or more student-friendly. The use of social media in architectural learning is currently very beneficial for lecturers and millennial students, as long as the learning activities are adjusted to the learning outcomes.

Feedback from students also motivates lecturers to use social media in learning activities more intensively. Although quite a number of students think that online lectures reduce their interaction in the real world, most students recognize that the use of social media is very exciting and makes it easier for them to learn. Some students also prefer to maintain their privacy on social networks, so that lecturers need to encourage them to have a public account for academic and professional purposes. Having a public account is very useful and can encourage the creation of a PLE in which students become self-directed learners. Currently, many educational institutions and industries at the local, national and international levels already have accounts with which they share content on social networks.

This research is a preliminary study and serves to provide input for classroom/studio action research. Further research needs to be conducted to determine the effectiveness of using digital technology or social media in architectural learning activities after the Covid-19 pandemic. In addition, similar research can also be carried out on younger class of architecture students who were born after the year 2000, who are called Generation Z. Do Gen Y and Gen Z have different learning styles? What is their feedback on the use of digital technology in learning activities? Are there any differences in the effectiveness social media use in learning activities for theoretical courses and studio courses? These are a number of issues that need to be answered in future research.

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