Z-generation learner characteristic and expectation in the RI 4.0 era: a preliminary research in physics teacher college in Lampung

H Maulina1*, A Abdurrahman1, I Sukamto2, N Kartika1 and N Nurulsari1
1 Pendidikan Fisika, FKIP Universitas Lampung, Lampung, Indonesia
2 Pendidikan Guru Sekolah Dasar, FKIP Universitas Lampung, Lampung, Indonesia
*hervin.maulina@fkip.unila.ac.id

Abstract. Z-Generations are student who was born in the years of 1995-2015. This generation is characteristic of media consumption of at least 3 hours a day online mostly using mobile phone. Physics learning process or teaching strategy have to consider also the characteristic of student who belongs to this age. This study is conducted in order to consider physics student characteristic and expectation in learning process, so that lecturers are able to use appropriate teaching strategy in their class. The study of this research is descriptive qualitative using survey technique. Survey technique using questionnaire to 165 physics teacher college in Lampung. Based on data analysis, it can be conclude that Z-generation learner characteristic in Lampung is mostly interested with technology integration in learning process. Besides that, they are also distributed in 3 kinds of learning style that are visual, auditory, and kinesthetic.

1. Introduction
Technology develops so rapidly that it affects several fields of life, including the education sector. Accelerating the development of technology and information that requires the world of education to respond quickly to create the 21st century generation that has creativity, perseverance, and problem solving skills that are then combined with a work ethic that is both individual and individual in groups [1]. In general, some 21st century training programs that must be mastered by students to be successful in their education and career are communication and collaboration, fluency in communication and research, fluency in research and information, expertise in evaluation, problem solving and success, digitalization, and technology [2, 3, 4, 5].

Digitalization and technology are famous among Indonesia students, furthermore in the world. These 21st century skills need to be accompanied by self-control in using Science and Technology products. Especially in today's digital era, where students are easily to acces information through their Smartphone. Without proper treatment, the ease of accessing this information can even accustom students to hang on to every problem solving by using search engine facilities via a Smartphone. This addicted will give bad influence for intelectual intelligence [6]. Therefore, science and technology needs to be integrated in learning. Besides being able to direct to get correct information more easily, educators can also guide students to integrate the various types of information obtained so that students will get used to assessing a problem from various points of view.

Many studies have examined the application or integration of technology in learning, including technology-based learning media (e-learning) [7,8], the use of social media in learning [9, 10], and the use of Learning Management System (LMS) [11]. It turns out that the integration of technology has a
positive impact on student learning outcomes, namely improving learning outcomes. In addition, with a touch of technology, an abstract physical system that is not possible to bring to class can be visualized through modelling.

Nevertheless, in learning in the classroom, a lecturer must be able to create learning strategies that are appropriate to the characteristics of students (in this case Z-generation). Z-Generation or also known as Net Generation has the characteristics of having a computer/laptop, having a telephone, using the internet to access tasks, searching for everything through Google, and having a social media account. In general there are 20 groups of characteristics of Net Generation namely 1) Technology savvy, 2) using search engines for looking for information, 3) interested in multimedia, 4) creating internet content, 5) operating at "twitch speed, 6) learns by inductive discovery, 7) learn by trial and error, 8) multitasking on everything, 9) short attention span, 10) communicates visually, 11) social cravers face-to-face interaction, 12) emotionally open, 13) Embrace diversity and multiculturalism, 14) prefer to work in teams and collaboration, 15) strives for lifestyle fit, 16) goal-oriented, 17) need to be recognized for their effort, 18) thrives on instant gratification, 19) fast response, and 20) prefer typing in PC or Notebook than write in papers. The characteristics of these students can be used as a basic for determining the learning strategy that will be used. For example, for Tech savvy, instructors use learning strategies by using digital tools thoroughly both in the classroom, assignments outside the classroom, activities, and demonstrations [12].

Physics is a branch of science which contains various physical phenomena that can be observed directly or indirectly. Of course in explaining the concepts of physics, first of all a teacher must recognize the characteristics of the students being taught in order to determine the appropriate learning strategy. Appropriate learning strategies can optimize the potential of students, so that it has a positive impact on learning outcomes. This can be seen from the classification of the year they were born [12]. In addition, the characteristics of physics, chemistry, biology or even social students may be different, so the learning strategies applied are different. This research was conducted to investigate the characteristics of prospective physics teacher students in Lampung province and to know their expectation in learning physics.

2. Method
This study of this research is descriptive qualitative using survey technique. Survey technique using questionnaire which given to 165 preservice physics teachers in Lampung, Indonesia. The questionnaire consisted of 23 questions to investigate the characteristics and 1 question about the expectation of preservice physics teacher.

3. Results and Discussion
The current generation of physics teacher preservice is included in the Z-Generation. Z-generation itself is a person born in 1995-2015 [12], in this case they are preservice physics teacher in Lampung. This generation has friendly features with digital tools such as phone/cellular or searching engine machines. In addition, this generation spends at least 3 hours online through phone/cellular. So that this can be directed to positive things, an investigation is needed to map the characteristics of preservice physics teacher. By knowing the characteristics of the preservice physics teacher, the lecturer can determine the appropriate learning strategy. Table 1 is the result of a survey of 165 preservice physics teachers in Lampung.

Table 1. Z-Generation characteristic based on survey of preservice physics teacher in Lampung

| Z-Generation Characteristic                          | Percentage (%) |
|------------------------------------------------------|----------------|
| Involve technology in learning / assignment / learning activities / demonstrations | 93,9 | 6,1 |
| Involves virtual or augmented reality for simulation learning | 92,7 | 7,3 |
| Z-Generation Characteristic                                                                 | Percentage (%) |
|-------------------------------------------------------------------------------------------|----------------|
| Like given assignments that can be accessed through search engines                         | 84,2           |
| Learn while listening to music                                                            | 53,3           |
| Learn from a variety of media                                                             | 96,4           |
| Like if given a task related to the Web, writing a blog, microblog, and also making YouTube videos and others | 47,9           |
| Like to learn quickly                                                                     | 59,4           |
| Likes to be involved in the learning process                                              | 87,9           |
| Likes learning to test strategies for finding solutions, involving unconventional technological methods, encouraging brainstorming and problem solving | 92,7           |
| Likes to do many tasks in class (typing, listening to music, playing online games, and sending e-mails, etc.) | 60             |
| Interested in learning that includes graphics, pictures and visual representations to illustrate concepts, theories, or procedures | 86,1           |
| Likes learning in class in small groups through active and collaborative learning activities in real and virtual environments | 93,9           |
| Likes learning by direct and online methods to encourage interaction and sharing opinions  | 95,2           |
| Can learn with various types of groups, ethnicities, races, and genders                    | 98,8           |
| Having work demands outside of college activities within the family                       | 42,4           |
| Like getting feedback on work done                                                        | 98,2           |
| When the teacher explains like listening while taking note of important information         | 90,9           |

Based on Table 1, it can be analyzed that preservice physics teacher in Lampung in general likes learning that involves technology in it. Preservice physics teacher in Lampung has the learning style shown in Figure 1. These results indicate that there are preservice physics teachers who have more than one learning style.

Moreover, we also captured preservice physics teacher expectation in leaning process (Table 2). Based on survey, there are six categories of expectation of preservice physics teacher in Lampung.
Table 2. Preservice physics teacher in Lampung expectation

| Category               | Expectation                                                                 | Percentage (%) |
|------------------------|-----------------------------------------------------------------------------|----------------|
| Integrating technology | In my opinion learning that makes students easy and happy in understanding material is to include pictures or media that can make students happy to learn such as cinematic videos about physics or others, as well as learning that involves technology, in small groups that are active and collaborative. | 28.4           |
| Learning by example    | Teachers who can explain well and gradually and give examples to better understand the material presented. Provide specific examples, principles, rules that allow students to estimate the general nature contained in the example. | 20.6           |
| Concept enrichment     | Learning with a conducive state and the importance of understanding the concept of a material in the simplest way by any method. | 15             |
| Student-centered       | Interactive, demanding students to have a big role in the learning process. Active learning where students can express their opinions without fear, involving students (student-centered) and contextual learning, training the ability to reason (HOTS), creative thinking skills, communication, and collaboration. | 17             |
| Experiment             | The learning that I hope for is explanations in class and experiments or other activities that can make it easier for students to remember or understand them, so that students not only memorize but understand and be able to apply them | 10             |
| Problem solving        | I expect learning where the teacher gives the material along with the application. Then students are given problems related to the theory that has been submitted and students must solve the problem by using concepts and at the time of problem solving, the teacher acts as a facilitator (if special guidance is needed outside of class hours). More emphasis on understanding than a number value. | 9              |

Preservice physics teachers are a group of teenagers born after the mid-1990s. It is fully agreed that they are Z-Generation [13]. This generation likes learning that involves technology because of its ability to manage the internet, smartphones and applications [14]. This technology can be either virtual or augmented reality for simulation. This is very reasonable because they are something that is sometimes abstract and born from natural phenomena in physics learning. Therefore, to better consider the concept; Direct experience is needed. However, direct experience may be difficult to present in learning. One solution in this digital age is to replace it with simulations and various kinds of media. Thus, concepts and theories that are difficult to understand can be simplified by providing images in the form, graphics, learning videos or simulations.

Moreover, in the digital era preservice physics teacher has more opportunities to watch online videos available on YouTube as a source of information. This is reinforced by 95% watching videos online every day [15]. Other research also shows that Z-Generation individuals see 70 videos a day on average, including online videos; to get daily teaching information [16]. Through online videos, they
get examples of phenomena in the environment related to learning material. Thus, understanding their concepts will be deeper.

Z-Generation also has a higher tendency to switch quickly from one information source to another [17]. This is very possible considering that focusing on one thing for a long time will feel boring. This condition allows them to switch to different things or find other sources of information through search engines. In fact, they do it while listening to music to get a more relaxed learning atmosphere. This is consistent with the fact found by Black (2019) that Z-Generation members have a tendency to multitasking and are more active when given the freedom to use various technologies [18]. Furthermore, the videos or sources online can be accessed anywhere, not necessarily in the classroom; so that interaction between students and educators can be continued virtually / online through social media that is equivalent to face-to-face meetings [19]. This takes into account that the best conditions of preservice physics teachers in learning differ. Thus, need flexibility in learning time. This can be overcome by having online learning resources.

These characteristics prove that the physics teacher preservice has a visual and auditory learning style. That is, they need to see and hear to be able to understand the material in learning. In addition to the characteristics of the learning material, this condition is also a characteristic of the physics teacher preservice where they are familiar with gadgets that make it easy to access all information in an interesting form. These habits tend to make them feel more difficult when learning something abstract, maybe even only presented verbally.

However, not all physical matter can be understood only by seeing and hearing. Preservice physics teacher needs to need to do physical activities related to the material to master it. This is a kinesthetic learning style. The simplest way is to take notes while listening to the educator explain the material. Even more complex, they need to do experiments. By touching and using experimental devices, they can study things based on facts obtained by using more senses. This situation is in accordance with the concept of learning and their expectations, namely learning centered on students. Through experiments, preservice physics teachers also have the opportunity to interact with others. Thus, collaboration will be created in learning where the learning process is carried out in small groups and group members actively support each other's learning process without distinguishing the different characteristics of each member. This collaboration is very important for Z-Generation because they have independent learning characteristics and are accustomed to learning with the help of YouTube tutorials [21] or other learning resources. This collaboration will be more optimal if there is presented a problem that needs to be solved by the study group.

4. Conclusion
Based on results and discussion it can be conclude that preservice physics teacher in Lampung is mostly interested with technology integration in learning process. Beside that, they are also distributed in 3 kinds of learning style that are visual, auditory, and kinesthetic. So, learning for preservice physics techer in Lampung is learning that involves technology and learning using interactive multimedia.

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