

Effectiveness of Differentiated Instruction in a Virtual Learning Environment on Improving Pangasinan State University BPED Students Academic Performance

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Abstract – Modern classrooms are growing more diverse, it is natural that we looked for methods other than traditional instruction that take into account different learning styles. This study sought to determine whether students' academic performance might be improved by using differentiated instruction in a virtual learning environment. The study employed an experimental research design with a pre-test and post-test. A content and reliability test were conducted with a 50-item multiple-choice test. The study made use of descriptive statistics including mean, percentage, and t-test. On the pre-test, the students had a lower mean score and Mean Percentage Score (MPS). The results of pre-test indicate that the learners did not meet the desirable competencies in Physical Education. On the other hand, in the post-test, the students' mean and Mean Percentage Score were higher. Hence, the students had improved performance. As a result, the learners did better on the post-test than on the pre-test. The outcomes of the t-test further validated this. The t-test results show a significant difference between the learners' academic performance on the pre-test and post-test. The students fared better on the post-test than they did on the pre-test. This suggests that differentiated instruction is essential for improving students' academic performance. This study adds to the body of research on the efficacy of differentiated instruction. Additional study regarding differentiated instruction is suggested that will involve bigger sample size of participants in order to support the students with dynamic learning capabilities.

Keywords – Differentiated Instruction, Virtual Learning, Modern Classroom

INTRODUCTION

The main thrust of physical education is to develop learners' physical competence and knowledge of exercise and safety, and their ability to use them in a variety of activities associated with developing an active and healthy lifestyle. It also develops the confidence and general skills of learners, particularly those of collaboration, communication, creativity, critical thinking and aesthetic appreciation. Along with maintaining positive values and attitudes in physical education, these form a good foundation for lifelong and lifelong learning for learners (Wai, 2018).

Most of what we know about physical education classes is that they are specific activities that contribute to the entire company. We can identify sports (baseball, golf, tennis, soccer, and bowling), the kinds of activities we need, plus a weekly magazine like Sports Intellectuals, which is also broadcast on radio and television. While we don't pay much attention to the parameters of the sport as a collective enterprise, we have a bit of a difficult time identifying most of the pieces.

School sport in general consists of many components: the instructional program, adapted physical education, the school and club sports program, as well as the interscholastic program. The physical education teachers consider the classroom program to be the foundation of the other program, which includes all high school physical education classes. The curriculum focuses on teaching motor skills, physical fitness, knowledge, and attitudes to all learners (Burton, 2018). The designer of physical education programs tailored for the individual whose developmental needs cannot be met smoothly or successfully through the regular instructional program. This program provides for learners with special needs, learners who have a permanent disability, such as Adapted Physical Education emphasizes individual instruction to meet the unique needs of each learner in the program. The role of physical education and sports activities in each individual's society provides the basic information necessary to understand the nature and scope of sports activities.

In adapting to the “new normal” of digital classrooms during COVID-19, the focus initially was to bring the curriculum fully online. But now educators are looking for ways to adapt their lesson plans to this new paradigm to make class time more engaging and effective.

Teachers recognize that learners learn in different ways and at different speeds. But the idea of providing learners with a personalized learning experience in a digital classroom can be a daunting, if not impossible task for teachers thrown into the depths of the digital world. But this environment is really suitable for engaging different types of learners through personalization, and it doesn't necessarily require a large technical learning curve.

While a personal online approach may seem a little different than in a traditional classroom, there are ways to adapt teaching methods and approaches to the online world to meet the needs of learners, from introverts to extroverts. An additional advantage. It will capture their attention and prevent them from being turned off or distracted during the online class.

A nuanced approach to teaching is based on principles that include providing a high-quality curriculum, using flexible groupings, and administering ongoing assessments within a community that respects learning activities that are challenging for all learners (Tomlinson, 2001), cited in Colquitt (2017). Differentiation has often been confused with the term “personalized learning” and for the purposes of this study it is important to distinguish between the two.

De Waters (2017) stated: “Personalized learning occurs when teachers and learners work together to develop a personalized way of learner learning. De Waters (2017) stated that personalized learning diverged with differentiation in emphasis on learner interests, needs, will, and motivation. This global definition can encompass many teaching methods. In practice, many virtual schools use this term to encourage learner-selected and guided learning. On the contrary, differentiated teaching is possible thanks to the association between the teacher and the needs of the learners. Differentiated teaching can sometimes take on the aspects of a personalized learning task, but ultimately the learning experiences are guided by

learning objectives, with the teacher moderating the process.

The literature has defined differentiation in practice mainly through research in traditional face-to-face teaching (Turner and Solis 2017). Teachers who stay true to the differentiation model collect a) information during lesson observation to tailor lessons to learner interest and learning profile, as well as willingness to learn the topic or state standard, b) to promote class community, c) Group learners flexibly and d) use formative assessment for learning. These well-known classroom indicators are supported by research on cognitive learning. A successful learning community is focused on knowledge, learner, and assessment.

Differentiated teaching has been shown to have a positive influence on learner achievement. Best practices for teachers to differentiate teaching include (a) collecting information about learner interests, learning profiles, and learner willingness; (b) cultivate community in the classroom, (c) divide learners into groups that can be easily switched based on activity, and (d) use formative assessments for learning (Doub, 2017). In differentiated classrooms, the community is empowered through the use of formative assessment, which teachers use to determine a learner's willingness, interest, and learning profile to access knowledge, skills, and / or understanding of a learner during a learning experience. However, there is little research or literature on what differentiation looks like in the virtual school classroom. How do virtual school teachers differentiate their teaching and how is it seen in different types of virtual schools?

During the COVID-19 crisis, many schools required teachers to switch to online classes (Borup et al., 2020). However, online education was already on the rise before this recent crisis, so it is important to discover best practices for differentiation in virtual schools. The key aspects of classroom teaching may look different online, but it will always be important that teachers meet the needs of all learners.

Virtual schools have potential benefits, such as: Virtual schools can also help disabled learners who have Difficulties taking regular face-to-face classes (Miron and Gulosino 2016). The reported benefits of virtual schools include offering convenient lessons that

are tailored to learner schedules, allowing learners with other responsibilities during the day to meet their educational goals, and providing additional time for study. Virtual schools can also serve as a haven for learners who have experienced bullying. These benefits may be some of the reasons why virtual schools achieve high levels of satisfaction among learners, parents and teachers. Learner-oriented teaching is at the core of the differentiation philosophy, which is explained in the next section. Ellis & Gable, 2008, cited in Lucas, 2018. This approach has become popular in part due to a lack of time or the interest of teachers in dedicating their efforts to individual learning needs. However, the advent of new technology has allowed teachers to turn to multiple tools and applications that help to differentiate themselves. An example of new technology tools is Virtual Learning Environments (VLEs), which consist of a repository that can store many applications, as well as connect to external websites and many other Internet resources for educational purposes. In addition, new approaches to language learning have emerged that focus more on the learner than on the teacher to address individuality in the classroom. As an example we can take Differentiated Instruction (DI), in which "the teacher must be prepared to involve learners in the classroom through different learning modalities, attending different interests and using different teaching speeds along with different levels of learning. complexity". Therefore, in the present study, the use of a VLE and the implementation of a Differentiated Instruction (DI) approach were combined to determine its effects on physical education learning.

A virtual learning environment (VLE) functions as an important component of web-based lessons in education. Pidel (2018) defines a VLE as "one that allows learners to perceive the environment, evaluate situations and achievements, take actions and go through experiences and lessons that allow them to have more experience in repeating the same task with a better performance in similar circumstances". In other words, a VLE is a useful tool that allows learners to experience learning for themselves. A VLE is an opportunity to "normalize" technology in a classroom. It is "the office" of the class.

According to Logan's (2018) findings during the diagnostic phase of her study, learners did not achieve the desired competencies despite the existing

facilities and sports laboratory. On the other hand, despite the fact that there are many research studies that show the effectiveness of DI in learner performance, and after reviewing several journals and articles, it seems that many teachers in Colombia and especially in the department von Huila did not take these results into account to create a differentiated learning environment. Also, there are not many studies that integrate DI and technology to aid teaching, encourage innovative activities, or increase motivation. Therefore, the present study aims to answer how differentiated teaching through a virtual learning environment affects the academic performance of learners in physical education:

DI is a teaching approach that focuses on addressing individual differences, learning styles, intelligences, etc. According to Tomlinson (2005), cited in Colquit (2017), "Differentiated Instruction is a key objective of differentiated teaching is to maximize the learning potential of each learner". "The DI approach is an alternative to give our learners the opportunity to learn according to their interests, learning profiles or levels of readiness. As a result, teachers can no longer think of learners as identical subjects with backgrounds, preferences and similar styles DI teachers perceive each learner as a complete universe and therefore do their best to tailor the lessons to their individual needs. In this sense, Tomlinson says, they are teachers who do everything they can to ensure that low-learning and advanced learners, learners with different cultural backgrounds, and children with different backgrounds grow up to the best of their ability every day, week and week. all year.

In this context, this concept enables teachers to tailor lesson content, process, and products to the will, skills, learning style, and interests of individual learners. This means that the DI approach is flexible in four didactic elements. The first element is content, which Tomlinson defines as "what learners should learn and the materials or mechanisms by which this is accomplished." According to Tomlinson, differentiating content is providing multiple avenues to address "the facts, concepts, generalizations or principles, attitudes and skills related to the topic, and materials that represent those elements." This emphasis can be of great benefit to both fast and slow learners, as the amount and depth of content can be adapted to different learning paces. We can vary the content without losing sight of the curriculum (Levi, 2018).

The VLE used in this research study is Facebook (FB) Classroom, a free open source learning management system or online learning platform serving educators and learners around the world. This platform has various tools and applications to use, such as chats, forums, discussions, tests, homework, lessons, wikis, and questionnaires, among others. The FB classroom offers many advantages. For example, it encourages learner learning and facilitates interaction between learners, as well as between learners and their teachers (Skiene, 2018). By using VLE, there is a shift from teacher-centered classes to learner-centered classes.

Photos and Browne (2018) state that the integration of Internet technology and the language learning curriculum has shifted the focus from teacher-centered classrooms to learner-centered environments, giving the learner the ability to be in control of classroom content and the learning process. The teacher becomes more of a facilitator than a tutor. The teacher is a facilitator of resources while guiding learning through the discovery of new knowledge. Once a teacher has developed an understanding of the interests, disposition and learning profile of learners, it is possible to differentiate between content, process, product and environment (Santiago, 2018). It should be noted that content is not synonymous with curriculum. The physical education curriculum includes all the knowledge, skills, and learning experiences associated with the learning process. Content refers to learning that takes place in all three affective, cognitive, and psychomotor domains and can be demonstrated by learner behavior in the form of attitudes, understanding, and skills. The goal of differentiation is not to change the content, but to provide learners with multiple options to access the content or achieve the desired learning objectives of a unit or lesson. Using different teaching strategies can serve as the primary means of differentiating content based on learner disposition, interest, and learning profile.

According to Gray (2018), intra-task variations and guest teaching are two strategies that ensure that each learner has the appropriate challenges. Teachers can vary an assignment for one or more groups of learners and then provide specific directions based on performance, while assignments are structured to encourage learner success. There are several methods of connecting content to learner interests.

Therefore, the teacher's time and effort to integrate technology into differentiated teaching can undoubtedly bring significant benefits to the learning process. The Internet is packed with a wealth of activities and resources that can easily meet the needs of a Differentiated Instruction (DI) implementation. Plus, the time teachers spend today on VLE-based lesson plans is time they can save in the future. VLEs have the advantage that all class activities, assignments, projects, and tests are saved for future adjustments and implementations.

The role of sport in today's world and the contribution that physical education and sport activity learners can make to society. Sports activities are a growing and expanding field. The growth is reflected in the expansion of knowledge due to the development of the field of study. The expansion of sports activity has created this field (Hiss, 2019).

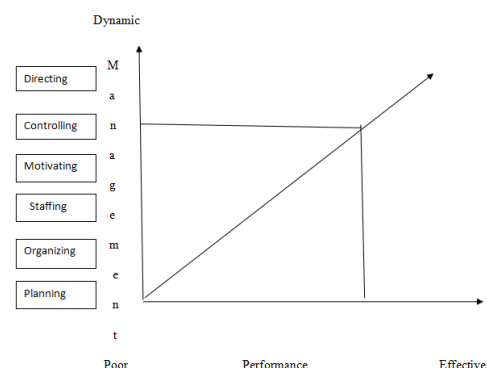
The study was designed with the researchers in mind to examine the effectiveness of differentiated teaching through virtual learning environments on the academic performance of 46 college learners. The researcher sees the need to conduct the study because it is timely and relevant, and the lack of a study can serve as a basis for educational planning. Therefore, this study entitled "Effectiveness of differentiated instruction through virtual learning environment on increasing the academic performance of BPED learners" was proposed for study.

OBJECTIVES OF THE STUDY

General:

This study aimed to determine the effect of Differentiated Instruction through virtual learning environment to improve the academic performance of the BPED learners in Physical Education.

Specific:



The study will sought to answer the academic performance of the BPED learners in pretest and posttest and if there is a significant difference in the academic performance of the BPED learners in pre-test and post-test.

CONCEPTUAL FRAMEWORK

Physical Education (PE) develops learners' skills and confidence to participate in a variety of physical activities that become a central part of their lives both inside and outside of school. A high-quality physical education curriculum enables all learners to enjoy many types of physical activity and to be successful. You will develop a wide range of skills and the ability to use compositional tactics, strategies, and ideas to perform successfully. When they occur, they think about what they are doing, analyze the situation, and make decisions. They also reflect on their own achievements and those of others and find ways to improve them. This will help them develop the confidence to participate in a variety of physical activities and learn the value of an active and healthy lifestyle.

Finding out what they like to do, what skills they have in school, and how and where to be physically active will help them make informed decisions about physical activity for a lifetime. Physical education helps learners develop personally and socially. You will work individually, in groups and in teams and will develop concepts of equity and personal and social responsibility. You will take on different roles and responsibilities, including leadership, coaching, and office. Through the diverse experiences that physical education offers, they learn to be effective in competitive, creative and challenging situations.

Physical Education's goals are: Promote active and healthy lifestyles across the school board; Promote sportsmanship in all aspects of competition; expand the athletic experience and enjoyment of each learner; inspire a passion for active recreation and sports, and help learners reach their physical potential in a variety of sports settings.

Figure 1 presents the paradigm of the study using the Input-Process- Output. (IPO)

The first block is in the INPUT, and it contains the study's variables. These are the learners' raw data that

had been gathered through pre-test and integrating Differentiated Instruction (DI) as teaching intervention. The second block is the PROCESS, which includes administering the pretest examination, integrating Differentiated Instruction (DI) for two (2) months, administering the post-test examination, and testing for the difference between the respondents' pretest and posttest scores.

The third block is OUTPUT, is the difference between the test scores of the Second Year College learners in their academic performance in Physical Education before and after the use of Differentiated Instruction through virtual learning environment.

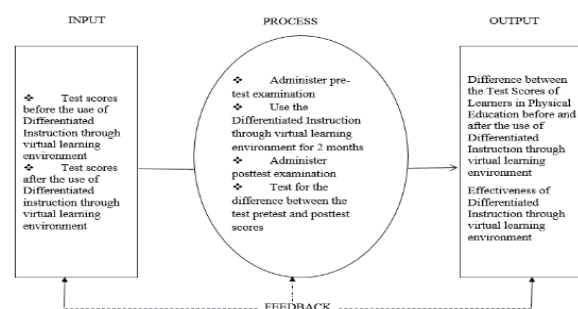


Figure 1. Paradigm of the Study

Data Gathering Procedure:

The sources of data of this study were the Second Year college learners taking up BPED at Pangasinan State University, Bayambang Campus during the school year 2020-2021. In the selection of the participants the researcher adopted the total enumeration technique. Total population sampling is a type of purposive sampling technique that involves examining the entire population that have a particular set of characteristics. This means that the BPED second year college were selected as the participants of this study. In terms of the gender profile of the learner-participants, there were 21 male and 25 female, totalling to 46 second year college learner-participants.

Statistical Tool:

The data gathered were subjected to statistical treatment. The problems presented in this research called for the mean, percentage and t-test. For Problem 1 mean and mean percentage score was utilized to answer the question. Mean is actually the average. In this study the mean is the summation of all scores of the learners divided by the total number of respondents.

This is to determine the common scores of the group. Further mean percentage score was utilized to determine the percentage score of the learners and to determine if they meet the standard set. To obtain the mean percentage of the learners the quotient of mean score and number of items multiplied to 100%. The following shows the given formula used in findings the mean percentage score.

Formula: $MPS = M/50 \times 100$

Where:

MPS = Mean Performance
Score

M = Mean

N = Number of Item

For Problem 2, it called for the one-tailed t-test in order to test any significant difference in the academic performance of the first year college learners before and after the treatment. One tailed t-test allots your entire alpha to testing the statistical significance in the one direction of interest. Since the level of significance of the study was 0.05 one-tailed t-test was used. In using a one-tailed test, the researcher is testing for the possibility of the relationship in one direction and completely disregarding the possibility of a relationship in one direction. In the case of the present study the researcher tried to determine the effect of differentiated instruction through virtual learning environment in the academic performance of the BPED college learners.

The t-test formula (Mc Lave, Dietrich and Sinrich, 1999)

Where:

$\sum D$ = summation mean of the difference between the pre-test and post-test

$\sum D^2$ = summation mean square of the difference between the pre-test and post-test.

N = number of participants

t = the computed value of the difference between the pre-test and post-test.

RESULTS AND DISCUSSION

Academic Performance of the Learners in Pretest and Posttest.

Figure 2 is a presentation of academic performance of the BPED learners in pretest and posttest.

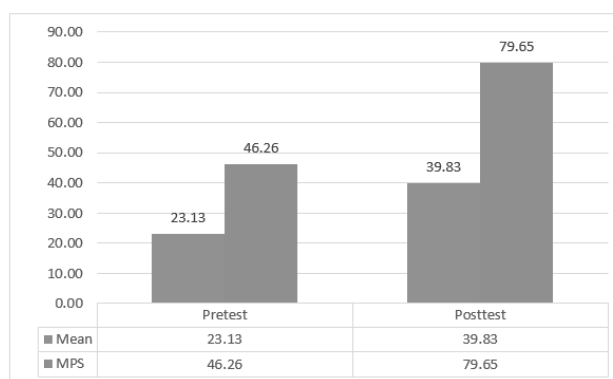


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In can be gleaned from Figure 2 the academic performance of the BPED learners in pre-test and post-test. In the pre-test the learners were able to post a mean score of 23.13 which was attributed to 46.26 mastery level. The results of pre-test indicate that the learners did not meet the desirable competencies in Physical Education since they did not meet 75% passing grade. The results of the pretest is a support to the study conducted by Colquitt in 2017 and Doub in 2017 where they discovered the poor academic performance of the learners in Physical Education during the diagnostic stage.

To supplement the modules of the learners, the researcher integrated differentiated instruction through virtual learning environment. The experimentation

lasted for 2 months or 8 weeks. At the end of experimentation, posttest was administered to the same learners to measure their progress if there is any.

In the posttest the learners posted a mean score of 39.83 which was attributed to 79.65 mastery level. The findings of the present study are similar to the study conducted by Colquitt in 2017. The DI methodology focuses on the learner and not the teacher. As a result, learners were responsible for their own learning process and decided which activities should be undertaken according to their learning style, interests, and level of preparation. The teacher was present to help and guide the process. When learners have the opportunity to choose what they want to learn, their sense of autonomy grows. In addition, they are more comfortable with the material they have chosen, which in turn increases their motivation to learn. In short, the teacher empowers learners with learning ownership.

Further, Woodworth and his colleague (2016) asserted that differentiated instruction through virtual learning environment is effective teaching tool to improve the academic performance of the learners.

The previous roles indicate the relevance of the DIVLE implementation. Actions such as providing strategies, anticipating problems, facilitating the learning process and reflecting upon every single element of the classes are likely to help learners enhance their motivation, self-confidence and autonomous learning.

In similar vein, Another, important effect of the DIVLE had to do with learners' engagement in class. They knew that traditional teaching was changing as all the activities were quite unusual. Traditional pencil and paper activities in the textbook have been replaced by interesting, up-to-date and meaningful activities on the computer. Furthermore, the data suggest that the learning experiences of the participants were positive. Learning increased when computers were used as the main tool in the classroom. Learners seemed more interested in searching for information, understanding concepts, and communicating what they had learned.

Significant Difference in the Academic Performance of the BPED Learners in Pre-test and Post-test.

In order to determine the significant difference of the mean score of the learners in the pretest and posttest, t-test was used in this study.

Based from Table 1, there is a sudden increase in the academic performance of the BPED learners. It is because of the differentiated instruction through virtual learning environment that was being implemented. The statement above is attributed to the mean score of the learners in pre-test and post-test wherein the learners posted a higher mean in post-test than in pre-test.

Meanwhile, the t-stat is 21.13 while the t-critical is 2.01. Since the t-stat is greater than the t-critical, therefore null hypothesis is rejected in favor of alternative hypothesis. This means that there is a significant difference in the academic performance of

The results of the study were parallel to the study conducted by other researchers who found success in implementing this intervention to their learners. Differentiated instruction through virtual learning environment are able to trigger the learners' intrinsic motivation and provide highly engaging challenges to promote learning. The results in this study further confirms that differentiated instruction through virtual learning environment used in learners' activities are very effective and supportive activities in contributing to learners' academic performance.

The present study affirmed the study conducted by Miron and Gulosinio (2016). During, DI-VLE class, we found that learners use a variety of learning resources and strategies. Resources such as online dictionaries, translators, audios and videos, and strategies such as repetition and negotiation of meanings were frequently observed. All these measures have greatly helped his language learning. Therefore, DIVLE offers us many channels to make our lessons more interesting and meaningful while at the same time giving our learners the same opportunities for the development of our learners' L2 skills.

Lucas (2018) concluded that differentiated teaching through a virtual learning environment is an effective teaching tool to facilitate the teaching and learning environment. In the DI classroom, the learning environment influences the learning process of each individual learner.

According to him, the teaching environment in an environment that strives for differentiation is even more successful. A differentiated classroom must support and be supported by a developing community of learners. A differentiated teaching environment encourages learners to improve their language skills and therefore their learning; Learners also contribute to the learning success of their classmates when they support each other. According to the participants, the implementation of DIVLE enables an effective learning environment.

Logan (2018) Therefore, it can be stated that the implementation of DI-VLE also had a positive effect on the tasks themselves. For example, learners described the assignments as more attractive and different from the regular English class they have. They showed a positive attitude towards the various activities proposed by the teacher in the AVA.

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Likewise, Santiago (2018) Technology not only allows teachers to modify various elements of the learning process such as content, process, task or product, but it also has the power to positively influence our learners. It was evident that the DI-VLE intervention attracted the interest and attention of the learners. The DI-VLE also had an effect on the learners' sense of independence. Learners had the resources, activities, materials, and time to work at their own pace. In addition, the learners had the opportunity to choose the partners they wanted to work with. Yet, many of them preferred to work alone, and the effect of working with a classmate or working alone showed a pattern. Table 1 represents the significant difference in the academic performance of the learners in pretest and posttest.

CONCLUSION AND RECOMMENDATION

In the light of the forgoing findings, the following conclusions were drawn:

The academic grades of selected learners suggest that their level of performance improved after the teacher integrated the use of Differentiated Instruction through virtual learning environment.

The use of Differentiated Instruction through Virtual Learning Environment resulted to better academic performance compared to the traditional way. This study revealed that there is a significant difference between the grades of learners before and after the utilization of Differentiated Instruction through Virtual Learning Environment in their academic performance.

Based on the conclusions drawn from the significant findings and conclusions of the study, the following recommendations are offered:

1. Traditional way and teaching and the use of Differentiated Instruction and contents to learners both showed good result, thus the combination of both method is highly recommended.
2. The use Differentiated Instruction garnered better result compared to purely traditional way therefore, teachers are encouraged to utilize this device and fully integrate it in their classroom interactions.
3. Differentiated Instruction and content is a great addition to available resources of a school thus, its purchase and use is highly recommended in teaching Physical Education in Kindergarten.
4. Teachers should seek out these and similar resources when differentiating instruction for the first time. Although many resources have been developed for classroom-based learning, they can easily be adapted for the physical education setting.
5. Differentiated instruction should be viewed as a philosophy that can improve how learners learn and that can provide new insight into ways teachers can promote learner success. Physical education teachers should recognize the potential of DI and gradually incorporate the philosophy into their curriculum.

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