

Challenges and Strategic Direction in Science Instruction: Towards a Proposed Learning Recovery Plan

Veronica De Vera Villamor

Bataan Peninsula State University

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ABSTRACT

The study is a descriptive qualitative research design. It involves the collection of data in the form of words and language instead of numbers. The respondents of the study are the selected Science teachers in the secondary schools of the City Schools Division of Balanga. The respondents were selected using a purposive sampling technique, which is a non-probability sampling technique, to gather qualitative data. Purposive sampling technique was used due to the specific characteristics of the respondents needed to qualify as participants in the study. The study aimed to determine the challenges and strategic direction of science instruction towards a proposed learning recovery plan. Based on the study's findings, proper training, webinars, and seminars through face-to-face and online platforms should be provided to science teachers to ensure effective teaching practices. Furthermore, research and innovations must be done, written, and published to develop programs and activities that can be valuable for creating a proposed learning recovery plan for Science Instruction. The study concludes that the different issues and challenges of Science learning and teaching process include effective implementation of different programs and activities for the benefit of Science teachers and learners, and the strategic direction of Science can be done effectively through the proposed learning recovery plan of Science, which is an essential tool for both the teachers and learners of Science.

Keywords— Learning Recovery Plan, Strategic Direction, Science Instruction, Challenges in Science, Effective Teaching Process

INTRODUCTION

The COVID-19 pandemic crisis brought different scenarios to the educational system, which allowed the Department of Education to take necessary steps to ensure quality education and continuous learning. Over time, the Philippines has witnessed the economy's progress amidst the pandemic crisis, including the delivery of learning spearheaded by the Department of Education.

In emphasizing the value of the study, Samuel (2022) declared that education is the key to the growth and development of any country, so it is essential to address it. For education to play its role in the transformation of any nation, there must be a proper and effective educational plan because if there is deficiency in educational planning, it will affect the country's educational system and have lasting effects and long-term consequences. This is particularly significant in relation to science education process.

According to the Department of Science and Technology (2021), there are many constraints facing Science education in the Philippine setting because of the pandemic crisis; one of them is the shortage of qualified science teachers, lack of quality textbooks, inadequate equipment, large classes, lack of support from administrators, and many others. Most importantly, the Philippine educational system must address the learning losses caused by the pandemic in Science from its different areas among the learners.

Equally important, according to Briones (2022), in response to the learning losses in Science is the progressive expansion of face-to-face classes. The Department of Education (DepEd) is developing a learning recovery plan framework for Science to guide schools in addressing learning gaps due to pandemic-related disruptions. As more schools open their doors for physical learning, the Department is crafting a learning recovery program in

different fields, including Science, as part of our post-pandemic efforts. The Department of Education must ensure that the interventions are effective so that everyone can catch up and accelerate their learning. Moreover, DepEd plans to intensify its Scientific interventions, conduct regular home visits and follow-ups, implement physical and virtual study groups/buddy systems, establish literacy and numeracy at home and in the community, tap the services of parent or guardian teacher-volunteers, and develop appropriate assessment tasks and resources under the field of Science.

Equally important, the City Schools Division of Balanga had spearheaded the drafting and implementation of a learning recovery plan, which focuses on school implementation and delivery of learning to different subject areas, particularly significant subjects such as Science. However, only some studies have addressed the different issues and challenges of implementing a learning recovery plan that focuses on science education as perceived by science teachers and students, which need emphasis and focus. Instead of the provided data, the study aims to uncover information that could highlight the existing issues and challenges and the best practices for implementing a learning recovery plan, which centers on Science Education under the City Schools Division of Balanga.

Lastly, as a Professional Science Teacher in the Department of Education, the study is an excellent tool to address situations that focus on the status, issues, challenges, and opportunities in Science learning brought about by the transition of the educational system from a new normal to a better normal set-up through the help of the learning recovery plan centered in Science education. One of the essential tools the Department of Education uses to ensure quality education, particularly in science education practices, is the learning recovery plan. The study could serve as a valuable basis for future strides that the Department of Education can take to ensure education quality and effective delivery, guided by the learning recovery plan focusing on science learning practices.

Objectives of the study

The following are the objectives of the study:

1. To identify the challenges of Science Teachers in recovering the learning loss.
2. To identify the interventions made to address the challenges in Science instruction.
3. To identify strategic direction of the City Schools Division of Balanga in the field of Science.
4. To explain how qualitative findings support the strategic direction of SDO Balanga City in Science Learning.
5. To propose a Learning Recovery Plan based on the findings of the study.

Statement of the Problem

The study aims to describe the key challenges and strategic direction in Science instruction among Secondary teachers in the City Schools Division of Balanga. Specifically, this study sought answers to the following questions:

1. What are the challenges for Science teachers in recovering from the learning loss?
2. What are the interventions made to address the challenges in Science instruction?
3. What is the strategic direction of the City Schools Division of Balanga in the field of Science?
4. How do qualitative findings support the strategic direction of SDO Balanga City in Science Learning?
5. Based on the findings of the study, what Learning Recovery Plan may be proposed?

METHODOLOGY

Research Design

The study uses a descriptive qualitative research design. Qualitative research is a type of research that focuses on understanding human behavior, experiences, and the meanings people attach to them. Qualitative research collects non-numerical data such as words, images, or observations. The researcher study things in their natural settings, attempting to make sense or interpret phenomena in terms of the meanings people bring to them.

In the same way, the type of descriptive qualitative research is a method that utilizes qualitative data and is described descriptively. It is a specific type of qualitative research that aims to describe a phenomenon, experience, or event in a straightforward, detailed, and accurate way using participants' own words. It involves collecting data in the form of words and language, rather than using numbers. This method is used to analyze and describe descriptive data obtained from a research study. Descriptive qualitative analysis covers a spectrum from description to theory building and can be directed by a conceptual framework or driven by the data itself.

The descriptive qualitative research study perfectly fits the research study because the chosen method explores and understands the characteristics and qualities of a phenomenon, particularly the challenges and strategic direction of Science instruction. The chosen method also comprehensively discusses data collection and analysis techniques, including interviews, observations, and thematic analysis, which was used in the research study. The method highlights communication of research findings, along with a potential proposed learning recovery plan suited to the needs of the study.

Participants of the Study

The population of the respondents of the study are the selected Science teachers who are teaching in the secondary schools of the City Schools Division of Balanga. The selection of the respondents was done using a purposive sampling technique, which is a non-probability sampling technique, to gather data for the qualitative area of the research. The researcher chose the sampling techniques indicated because of the specific characteristics of the respondents who can only participate in the study. The inclusion criteria of respondents of the study include Science teachers teaching Science subject only, which is the target respondent of the researcher, was determined based on their length of experience, which is at least three years of teaching Science.

However, as part of the exclusion criteria of the participants of the study, a teacher with below three years of experience was not considered since there should be a testing period which is above three years for the best teaching practices used by the teachers in teaching Science to see if it is effective for the students or not.

Data Gathering Procedures

As for the initial step in gathering data for the research study. The researcher secured authorization from the selected participants of the study and organizations relevant to the study in adherence to research ethics. In terms of giving and collecting consent forms the research will schedule date to the selected participants of the study to compromise to their chosen schedule for their convenience. Once consents are well distributed and gathered the researcher will schedule an interview which is guided by interview guided questionnaires which will allow the research to feel comfortable in his or her set time schedule.

With this in mind, In the City Schools Division of Balanga, the data collection technique for the qualitative study approach included both primary and secondary sources of data collection. As for collecting documents content analysis of secondary data or documents showing the strategic direction in science learning in the SDO City of Balanga was done.

Furthermore, the data collected from the respondents of the study via the validated interview guide utilized in the research process is the most essential aspect of the research process. The researcher provided reliable questions to explore deeper Challenges and Strategic Direction in Science Instruction: Towards a Proposed Learning Recovery Plan.

The researcher began by obtaining information from related literature and relevant studies from various studies linked to the subject as a secondary source of data collection. The researcher assembled and summarized the data to serve as the study's foundation and platform.

Following that, the research used the primary data source, which was data collected from respondents via guided survey questionnaires and a series of questions for a non-structured interview.

Following thorough data collection, the researcher analyzed the data and concluded regarding the research study

to serve as a foundation for the development of the proposed Learning Recovery Plan.

Data Analysis

In analyzing the respondent's profile, the researcher utilized frequency and Percentage to determine the statistics behind the actual profile response of the selected respondents of the study. The data that was gathered was analyzed thoroughly after it was recorded and encoded in soft copy. The researcher carefully and manually interpreted the given data. The researcher analyzed the words that reached saturation by analyzing everything repetitively. Since manual transcription was used by the researcher. The researcher thought that it was the best fit for the study, which unlocked problems in the study. It was encoded and treated.

On the other hand, interview questions were collected, transcribed, and analyzed using manual transcription. A thematic analysis was created to help represent the central idea of the participants. The process of data gathering sought answers in the formulation of a conclusion to the qualitative part of the study.

A representation of the approach was done to describe and summarize how the exploration of the study was reflected and analyzed in the study.

RESULTS AND DISCUSSION

The study involves selected Science teachers from the secondary schools of the City Schools Division of Balanga. Table 1 shows the profile of the participants that includes the age, civil status and gender.

Profile Of Participants

Profile	f	%	Profile	f	%
Age			Highest Educational Attainment		
21 to 30-year-old	2	20%	Doctors Degree Completed	0	0%
31 to 40-year-old	2	20%	With Units of Doctorate	0	0%
40-year-old and above	6	60%	Masters Degree Completed	3	30%
			With Units in Masters	7	70%
			Not Applicable	0	0%
Male	2	20%	Length of Experience		
Female	8	80%	1 to 3 Years	0	0%
			4 to 6 years	1	10%
Designation			6 to 15 years	0	0%
Teacher I	2	20%	17 to 25 years	8	80%
Teacher II	0	0%	26 years old and above	1	10%
Teacher III	5	50%			
Master Teacher	1	10%			

Head Teacher	2	20%			
Total	10	100%	Total	10	100%

The Issues and Challenges of Learning Science in terms of Recovering from Learning Loss in the City Schools Division of Balanga

Delivery of Lesson

The theme above indicates that the delivery of lessons plays a significant role in being one of the major issues for Science teachers in the City Schools Division of Balanga. Based on the participants' responses to the study, effective lesson delivery increases the motivation and academic performance of Science students. It can be revealed that lesson delivery is a significant factor affecting science learning and teaching experience for Science teachers.

According to Instruction in Libraries and Information Centers (2020), instructors often describe teaching as an art. Once we step into the classroom, the work resembles a performance. The delivery of the lesson can substantially impact our learners' engagement and the overall effectiveness of the lesson. Dynamic teachers who seem excited about their work and care about their learners will spark much more interest than those who seem bored or condescending.

Adjustment to Learning Set-up

One of the significant themes highlighted in the study is the adjustment to the learning set-up. Adjustment to learning set-up from online and modular to in-person face-to-face classes has been a significant issue in Science learning. It can also be revealed that adjustment to the learning set-up comes from various circumstances that may happen to any Science students and Science teachers.

In relevance to the revealed theme above, Sharma (2023) said curriculum development refers to creating educational programs and materials that align with today's updated educational standards and incorporate relevant subjects or skills today and for the future. It involves researching and selecting appropriate content, designing courses and manuals and instruction manuals, evaluating the information already part of the curriculum development, and making updates or changes wherever necessary. The goal is to ensure that students get comprehensive learning experience that meets their needs and prepares them for the future.

Curriculum Content

The content of the curriculum has been a significant factor in the effective delivery of lessons and the experience of the Science teacher in the Department of Education. It has also been a major issue since there is a significant need to be able to match the content of the curriculum effectively, depending on the needs of the students and the status of the situation. Effective curriculum content contributes meaningfully to a practical Science learning experience. The responses below support the statements above.

In addition, Sharma (2023) said that curriculum development refers to creating educational programs and materials that align with today's updated educational standards and incorporate subjects or skills that are relevant today and for the future. It involves researching and selecting appropriate content, designing courses and instruction manuals, evaluating the information already part of the curriculum development, and making updates or changes wherever necessary. The goal is to ensure that students get a comprehensive learning experience that meets their needs and prepares them for the future.

Lack of Resources

One of the highlighted themes is the need for more resources. Lack of resources has affected various educational movements, particularly in learning Science, since science learning requires laboratory equipment and

technology to further enhance the student's skills and knowledge. It can be revealed, based on the responses of the participants of the study, that lack of resources had been one of the major problems of the educational system and local government in support of the immediate need of the science teachers and learners under the City Schools Division of Balanga.

Similarly, according to Malipot (2020), The lack of resources amid the ongoing public health situation caused by COVID-19 is the "biggest challenge" for many parents, students, and teachers as they prepare for the opening of a new school year. Schools need help to provide what they need for blended or distance learning, but it is tough for now, she said in Filipino. People are trying to save up to buy the gadgets their children need for online learning, but they cannot do that now with the Modified Enhanced Community Quarantine.

Addressing Learning Gaps

One of the significant issues is addressing learning gaps. Learning gaps in science education resulted from the gap that happened from the pandemic setup to the current setup of the learners under the City Schools Division of Balanga. It had been a significant issue among the Science teachers to address learning gaps given the limited time to cover everything and the time that was gone due to the previous learning set-up, specifically in Science.

Furthermore, according to Hegwood (2022), a learning gap is a disparity between what a student has mastered and what is expected at their grade level. Students may have a learning gap in one subject area or in their education. A student's education builds on previous concepts, like building blocks. If you need foundation blocks at the bottom, you can keep building. If a student has learning gaps, they need help to keep building and learning more complex concepts. Learning gaps make it difficult for students to keep up with their peers in the classroom, negatively impacting their confidence and mental health. Eventually, it can even bleed into their social relationships and development.

Interventions in Addressing Different Issues and Challenges in Learning Science

Peer Tutoring

It can be revealed that peer tutoring was one of the effective interventions that is being used by the participants of the study. Peer tutoring is the collaborative effort given by the peers of co-schoolmates or classmates of the learners who need special attention in his or her academics. Peer tutoring has proven to be one of the most effective interventions science teachers can use to reach their goals and objectives.

Moreover, Fink (2022) clarified that an alternative model for teaching puts students' peers into the instructor role. By peers, people mean students in a similar position in life. In other words, neither has authority over the other. When we look at school-aged students, this also typically means the peer teacher is in a similar age group to the students' learning. While these students may be similar in age and education level in general, when it comes to the subject at hand, the peer teacher has greater understanding and experience than their peer students. These peer teachers may be exceptionally talented in a particular area and have excelled and progressed more rapidly than their peers. Alternatively, they may have taken classes their peers have not. Peer teaching can work on small and large scales. When peer teachers are the sole instructors in a class, they can work under the administrative guidance of adults.

Trainings and Seminars

One of the effective interventions that can be done and should be continuously done for science teachers is the effective implementation of science teaching training and seminars suited to the needs of science teachers and learners. Practical training and seminars show increased capability for teachers to address learning gaps among the science learners in the City Schools Division of Balanga.

In support of the theme revealed above, according to Kaka Kumano (2018), teachers are a crucial and integral part of the education system. A great teacher is crucial to a student's development and growth. As teachers, we are always concerned about the education the students receive. However, rather than focusing on the classroom,

we should take a step forward and think that if education is going to improve, we must improve initial teacher training. Personalized education is not rocket science; let us be honest: it is much more complicated. Moreover, the training for the teachers must be such that it makes students' lives easier and learning effective, which we do not see often. Teaching is a necessary process, but the teacher is the fundamental element and is always the method that determines the system's output.

Remediation Activities

It can be opined, based on the responses of the participants of the study, that remediation had been tagged as one of the best practices used to address issues and challenges of Science learning and teaching experience. Remedial classes effectively address the poor academic performance of science learners and help science teachers reach their targets and objectives for their learners.

Notably, according to Seahorn (2020), schools try various intervention tactics When students struggle with academic concepts. Remediation strategies are one type of intervention. Effective remediation involves assessing the student's needs, providing intervention, and evaluating student outcomes. Successful remediation programs adjust the instruction based on the student's response to the intervention. In remediation, teachers try to correct a deficit rather than teach students to cope with the deficit. Through remediation activities or lessons, teachers help a student improve his skills through direct instruction. Remedial instruction is focused on the specific concepts with which the student struggles. Remediation strategies include reteaching, alternative instructional strategies, task analysis, additional practice, and one-on-one tutoring.

Strategic Direction of the City Schools Division of Balanga in the Field of Science

Collaborative Effort

Collaboration was one of the critical themes revealed in the study. Collaboration contributes to effectively implementing best practices for science teachers under the City Schools Division of Balanga. Collaboration has been an effective best practice for science teachers and other stakeholders to achieve targets among the learners of science teachers.

According to UNICEF (2023), cooperation is a core life skill. It can be defined as the act or process of working together to get something done for a common purpose or to achieve mutual benefit. Cooperation demonstrates the ability to work effectively and respectfully with diverse people or teams, make compromises, build consensus in decision-making, assume shared responsibility for collaborative work, and value the opinions and contributions of individual team members from a position of firm self-identity. Cooperative relationships are socially motivated, shaped by a 'socially oriented' or 'common good' approach rather than a transactional approach focusing on personal benefit or material gain.

Experimental Approach

Experimental approach had been a vital part of the Science learning and teaching process which is essential in the focus of the study. The experimental approach includes the utilization of laboratories and experimentation in classes and how it helps students reach their potential, particularly in science. The following responses support the indicated theme above under the City Schools Division of Balanga.

To add a valuable description of the given theme above, according to Carpi and Egger (2023), experimentation is a research method in which one or more variables are consciously manipulated, and the outcome or effect of that manipulation on other variables is observed. Experimental designs often make use of controls that provide a measure of variability within a system and a check for sources of error.

Educational Technology

Educational technology was one of the highlighted themes based on the responses of the participants of the study. It can be revealed that the integration of technology in Science teaching processes improves the learning skills

of the students and contributes to valuable teaching experience among the Science teachers in the City Schools Division of Balanga. In addition, technology has been one of the significant contributors to 21st-century learning, an essential aspect of the focus of the study.

According to Dixit (2022), educational technology affects both the science of education and the art of teaching. It fully reflects the influence of science and technology. The practical side of learning is given more importance in educational technology. Educational technology affects the student, teacher, administrator, and school environment. It simplifies and empowers the teaching/learning process. Educational technology proves helpful in the spread of education and is a continuously developing subject. It mainly emphasizes achieving the objectives of education. It can bring necessary changes in the learning situation to fulfill the educational objectives. It is related to cognitive, affective, and psychomotor objectives.

Modification of Learning Materials

It can be revealed that based on the findings of the study, modification of learning materials had been one of the most highlighted themes, which has great significance to the focus of the study, which is the learning recovery experience of Science teachers. Modification of learning materials has always been a significant step for science teachers to achieve target outputs in terms of enhancing the student's academic performance in science under the City Schools Division of Balanga.

In relation to the highlighted theme above, according to the Illinois Early Learning Project (2020), when you have a learner in your Science class, you should be considering how to make your day-to-day classroom life more accessible to them. One way of doing this is through material adaptation. Materials adaptation is when you change an activity, manipulative, or toy slightly to meet the needs of a child with a disability or developmental delay.

Proposed Learning Recovery Plan centered in Science

The impact of a well-executed learning recovery plan in learning science can be profound and far-reaching, influencing various aspects of a student's academic journey and personal development.

It Improved understanding, enhanced problem-solving skills. It led to greater engagement long-Term retention and promotes personal Growth.

The following listed below are the detailed actionable steps based on the proposed learning recovery plan created:

1. Diagnose Learning Gaps

Conduct diagnostic assessments, for example quizzes, concept maps, short-answer questions at the start of the program to identify specific areas of weakness. Analyze past performance data exam results, assignments to track where foundational knowledge is lacking. Use student self-assessments and reflections to understand their perceived difficulties and confidence levels.

2. Revisit and Reinforce Foundational Concepts

Design remedial Science lessons focused on essential topics, for example matter, energy, ecosystems, and scientific methods. Use visual aids, models, simulations, and analogies to clarify abstract ideas. Develop a Concept Checkpoint system, where students must demonstrate understanding before moving to the next topic.

3. Promote Active Learning for Long-Term Retention

Use retrieval practice example mini-quizzes, flashcards regularly to reinforce previously learned content. Encourage students to create mind maps or concept webs after each unit to consolidate their learning. Integrate spaced repetition by revisiting key topics at increasing intervals over time.

4. Apply Learning Through Practical Activities

Implement hands-on experiments, simulations, or virtual labs that align with the concepts being taught. Organize project-based learning example building a simple model, investigating real-world problems like pollution or food chains. Use real-life scenarios and case studies to promote creative and critical thinking.

5. Personalize the Learning Experience

Offer student choice in how they learn videos, readings, group work, experiments. Allow students to select project topics that align with their interests, for example space science, environmental issues, technology. Group students strategically for peer learning, encouraging collaboration and mentorship.

6. Build Confidence Through Mastery

Use a small win approach to break down large topics into smaller, manageable parts and celebrate progress. Provide formative feedback often, focusing on effort and improvement, not just correctness. Include reflection journals where students write about what they learned and how they overcame challenges.

7. Integrate Skills for Problem Solving and Critical Thinking

Teach and model scientific thinking: making hypotheses, testing, analyzing data, drawing conclusions. Use open-ended questions during class discussions and assessments. Set up Science challenges or competitions where students work in teams to solve problems creatively.

8. Monitor Progress and Adjust Accordingly

Track improvement using pre- and post-tests, observation checklists, and student self-evaluations. Hold monthly review sessions to revisit difficult topics and ensure sustained understanding. Meet with students (individually or in small groups) to discuss progress and adjust goals.

9. Foster Personal Growth and Motivation

Celebrate both academic and personal milestones, for example improved focus, better time management. Integrate goal-setting exercises: short- and long-term learning goals, both personal and academic. Use stories or case studies of real scientists who overcame challenges to inspire perseverance.

10. Encourage Cross-Curricular and Real-World Connections

Link Science to other subjects (Math for data analysis, Language for science writing). Discuss careers in science and invite guest speakers to show the relevance of what students are learning. Plan field trips or virtual tours of science museums, research labs, or environmental sites.

CONCLUSIONS

Addressing challenges in Science teaching and learning requires a multifaceted approach that considers diverse student needs, supports teacher development, and fosters collaboration. Differentiated instruction, hands-on and inquiry-based learning, and the integration of technology can make science more engaging and accessible. Professional development, peer support, and partnerships with communities strengthen teaching practices and increase the real-world relevance of science education. Regular feedback and assessment ensure continuous improvement. A structured learning recovery plan is essential, as it identifies gaps, provides targeted interventions, and builds a clear pathway for both learners and teachers to achieve mastery. This plan also promotes equity, confidence, and long-term academic success in Science education.

Effectively improving Science education requires combining innovative teaching strategies, professional development, collaboration, and community involvement with a well-designed learning recovery plan. By addressing learning gaps and supporting both teachers and students, this approach creates a more engaging,

equitable, and sustainable Science learning environment. Ultimately, it equips learners with the knowledge, skills, and scientific literacy needed to thrive in a complex and evolving world.

RECOMMENDATION

This study contributes to the challenges and strategic direction in Science Instruction: Towards a Proposed Learning Recovery Plan in Science. In the light of the findings, the researcher came up with the subsequent recommendations.

1. Proper training, webinars, and seminars through face-to-face and online platforms should be provided to science teachers to ensure effective implementation of teaching practices. Furthermore, research and innovations must be done, written, and published to develop programs and activities that can be a valuable basis for creating a proposed learning recovery plan for Science education.
2. The study recommends the utilization of available resources. It should include the provision of additional funding for both equipment and facilities in every secondary high school in the City Schools Division of Balanga. The recommendation is for effective teaching experience in Science which is an essential element of the focus of the study. Moreover, the revealed intervention should be strengthened carefully through proper planning and reinforcement necessary for the benefit of both the Science 10 teachers and students under the City Schools Division of Balanga.
3. Continuous documentation and creation of narrative should be done appropriately to continuously monitor the strategic direction of the Science instruction of the City Schools Division of Balanga. In addition, documentation can serve as a valuable source of information for science teachers and administration in charge of enhancing their current practices and determining weaknesses, strengths, and opportunities to improve Science educational practices further. Support from the top managers should be appropriately given to maintain the right direction necessary to what is written in the target objectives relevant to the main focus of the research topic.
4. Based on the key challenges that are unlocked in the study, the Proposed Learning Recovery Plan for Science should be appropriately implemented and tested through selected schools that can be a pilot setting for the proposed plan. The plan is centered on addressing the key challenges in teaching Science. Recommendations and conclusions of the proposed plan for Science education should be adequately addressed and corrected to further improve the proposed plan for the benefit of Science teachers and learners.

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