



MODEL OF SOAP BUBBLES FOR SCIENCE TEACHING (THE 5 S's MODEL)

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Abstract

This paper suggested a model of soap bubbles for science teaching. To be employed in various subjects of science, so to be being used in other study subjects. The model consists of five consecutive stages, engagement, exploration, explanation, elaboration, evaluation. The engagement phase focuses on stimulating students' thinking. In exploration phase, students are concerned with practical activities to solve scientific problems. While the explanation phase, seeks to getting students solve the problems and answers the questions. In elaboration phase, provide opportunities for students to verify their understanding, broaden their perception. In evaluation phase, ensuring that students understand the concepts learned or acquired skills. In addition, the model has basis, clarifies its principles, and has five rules: continuous stimulation of the learners, teaching based on learners' freedom, the integration of traditional methods with modern methods, mutual, equal and equilibrium cooperation of all groups, and a comprehensive, diverse and participation evaluation of all parties in the teaching. The researcher explained the conditions for his success, precautions to be avoided, characteristics, tasks of the learner, and the roles of the teacher, not to mention learning outcomes.

Keywords: design of teaching, model, science teaching, soap bubbles, the 5 S's model

Introduction

The process of a model designing for teaching is both complex and urgent. The modeling includes an organized set of processes and treatments to build the model to engineering the teaching process, and facilitate its implementation based on a clear and structured vision to reach comprehensive learning outcomes that take into account the express and implicit of various aspects. The model design depends on the learning outcomes to be reached, where will we get? To clarify the theoretical basis and the intellectual premise, what are the foundations on which the model is based? At the phrase of the model, how will it proceed? In determining the activities and tasks of the learners, how can the actions be performed? In determining teacher roles, what are the appropriate roles? The model in science teaching is useful for simplifying the reality of science teaching:

physics, chemistry, biology, geology, astronomy, general sciences, scientific culture, public health and environment.

So, to provide new examples of possible implementation, by inductive of real experiences and mental perceptions, and blending them together into a new paradigm, that is a qualitative addition to the teaching models, which designed by other scientists. The present paper presents some mentions of these models.

The researcher has seen a set of models in the teaching field and found that each model has its phases and characteristics. These models are shown below.

The model (5E) consists of five stages: engagement, exploration, explanation, elaboration, evaluation. The engagement phase focuses on stimulating students' thinking by posing scientific problems in front of them or by asking them extensive questions. In exploration phase, students are concerned with practical activities to solve scientific problems and to answer the questions raised during the engagement phase; the role of the teacher is to provide adequate guidance and appropriate materials related to these activities. While the explanation phase, seeks to getting students solve the problems and answers the questions as a result of activities. In elaboration phase, provide opportunities for students to verify their understanding, broaden their perception and move the learning impact from the previous three stages in similar situations to what has been learned. In evaluation phase, ensuring that students understand the concepts learned or acquired skills during the previous four stages (Author, 2012).

Dienes model consists from five main phases: play (free & by rules), comparison, representation, symbolization, formalization. In the play phrase, free play includes direct and non-guided activities that allow students to manually manipulate some of the information and components to be learned, the teacher provides diverse and rich materials for students. In playing according to rules, the teacher sets new games and focuses on analyzing the concept into its elements. In comparison phase, the teacher helps students for discovering common characteristics of the concept elements in different examples from games. In the representation phrase, the teacher presents an example that combines common characteristics, this example may be a drawing, an illustration or a verbal example, so that students understand the structure of the concept. In the symbolization phase, students need to form appropriate symbols to describe what they understand, and the teacher intervenes so that there is no conflict with the information in the textbook. In formalization phase to structure the characteristics of the concept and to know its results and use (El -Abbas &Younis, 2012).

Driver model consists from five main phases: orientation, elicitation of ideas, restructuring of ideas, application of ideas, review chanting. In the orientation phase, the teacher displays activities about the content for student's brain storming in the new lesson. In elicitation of ideas phase, a teacher prepares a set of questions and learners answer them, which help to show information to students through groups that discuss them, and the teacher encourages them to explain the phenomenon. In restructuring of ideas phase, cooperative groups share ideas, opinions and conduct activities and experiences. In application of ideas phase, students apply the information they have acquired to increase their comprehension and clarity, and the teacher helps them to install information and prepare them for new learning. In review chanting phase, it reflects how will students are

performing, assimilating of ideas and adjusting them to primary ideas (Raji & Ali, 2016).

The model (5P) covers five main phases: persuasion, planning, performance, production, and presentation. In the persuasion phases, teachers investigate learners' past knowledge. Learners study the principles of the research process based on research ethics. In the planning phase, learners are trained to devise their research plan and share it with their fellows. In the performance phase, learners collect and analyze data. In the production phase learners are trained to interpret the outcomes after analyzing the data. In the presentation phase, the learners write their research reports and make presentations about the research process (Srikoon, Bunterm, Nethanomsak, & Ngang, 2017).

Models and modeling are key tools for scientists, science teachers and science learners (Coll, France, & Taylor, 2005).

In the role of modeling in the teaching and learning of science a 'model of modeling' framework formed from five phases: (1) learning to understand models (2) learning to use models (3) learning how to revise models (4) learning to reconstruct models and (5) learning to construct models. In order to identify the knowledge and skills that science teachers think are needed to produce a model successfully (Justi & Gilbert, 2002).

Moreover, it helps supervisors and teachers to choose a new model that is a real gain for the models used before, which expands the range of choices in teaching, and reduce the differences and difficulties in the work of the teacher to a level that makes it possible to understand the lesson more clearly.

The questions of the research:

1. What are the foundations, the characteristics and the rules of the 5 S's model?
2. What are conditions of success and cautions to be avoided of the 5 S's model?
3. What are expected learning outcomes from the 5 S's model?
4. What are the tasks of learners and the roles of the teachers in the 5 S's model?
5. What are the procedures of performance in the 5 S's model?

Significant of the research:

1. Follow international attention to the continuous development of science teaching through the use of new models to active learning.
2. to draw the attention of teachers and educational supervisors in elementary, preparatory and secondary schools to take care of the manner of the 5 S's model.
3. May benefit researchers to experiment and inquiry in the educational field about its effectiveness to develop various domains.

The aims of research:

The current research aims at know the foundations, characteristics, rules, conditions of success, cautions to be avoided, expected learning outcomes, the tasks of learners and the roles of the teachers, the procedures of performance in the 5 S's model.

Method

The researcher followed the qualitative approach that describes the status and suggested the phases of the model without any numbers or qualitative of the components to use in develop the educational life.

A qualitative study using a phenomenological was applied to explore the experience of the teaching among teachers and students in knowledge and skills sciences. Data were collected using one time semi-structured interviewed through science supervisors, teachers interview about their experience of teaching in schools.

Participants

There were a total of 33 sciences' supervisors and teachers who take a teaching experience more than seven years in science's' teaching, however; only 11 of the 33 supervisors and teachers have willing to participate in this study. The purposive sampling was chosen in this study in order to elicit the true experience of the science teaching in schools. The participants were 6 males and 5 females. All of them were 37 years old and in 7 years of applied science's' teaching.

Data analysis

Once data were collected, a categorical analysis was used to analyse data and findings were reported using a narrative format. Data were analysed using categorical analysis and transcribed after the interview occurred. The transcripts of these interviews were subjected categorically. Data were coded according to common experience. After that data were categorized into themes and interpreted to answer the research question. The final data were cross-checked among the researcher and with the participants to ensure the credibility of the research (Erawati & Keliat, 2018).

Findings and Discussion

The answer of the first question that states: What are the foundations, the characteristics and the rules of the 5 S's model?

The foundations of the 5 S's model:

The research is based on a set of foundations, perhaps the most important of which are the following:

1. Soaps are sodium or potassium fatty acid salts, produced from a chemical reaction called saponification. Each soap molecule has a long hydrocarbon chain, sometimes called its 'tail', with a carboxylate 'head'. In water, the sodium or potassium ions float free, leaving a negatively-charged head.
2. Learning is a long series of processes that depend on each other, can be learned by interacting with them, requires the learner to free his positive and negative ions to attract the appropriate long-term aspects of learning that resemble the soap interaction.
3. The learner needs a natural, human, social learning environment where seriousness, fun, flexibility, motivation, relaxation and expression with awareness about emotions. The learner uses soap daily, because of its importance before and after eating, after going out of the toilet, after playing,

after visiting the patient, in the shower; Linking with learning stimulates the learner to learn constantly.

4. The creation of new teaching methods is an educational necessity. It works to increase and improve teaching work, raise the efficiency of teachers, find renewable alternatives to obtain effective teaching outputs, and work to keep the attention of learners, and investigate what suits them.

The phases of the 5 S's

The model of 5 S's consists of five phases there are integrated and sequential, as follows:

1. Stimulus: the stimulus phase refers to stimulating the learner's interest and attracting his attention to the subject of learning and raising his learning capacity in order to accept high motivation on the subject of learning, through into account the concerns and preferences of the learners and providing freedom and democracy for effective learning.
2. Submit of choice justification and voting: the submit of choice justification and voting phase refers to Encouraging dialogue among learners, accepting the other opinion, and learning based on the selection of several options that is similar to learning paths, which fit the learner himself, and not imposed on him. It is giving a sense of self-satisfaction and satisfaction of others.
3. Structure of groups and actual implementation: the structure of groups and actual implementation phase refers it is very necessary that the combine learning between individual doing and team doing, that based on direct experience, engage in learning processes, and intelligent replication of work rather than automatic repetition. The exclusion of any learner from the learners, but the involvement of everyone according to the principle of learning for everyone and everyone must be learning.
4. Substitutional evaluation: the substitutional evaluation phase refers to comprehensive assessment of different areas of learning, real evaluation and participate in the evaluation process of all who are related to the learner addition to peer assessment for others.
5. Supply a bridge to the next lesson: the supply a bridge to the next lesson phase refers to provide the learner with the next learning thread, according to the principle of continuity of learning, so that learning succeeds and the learner is ready for the new learning of the next. It is necessary to plant a seed that remains radiant in his mind only when the new learning occurs next time instead of learning or intermittent.

Explanation diagram of the model

The researcher suggests a diagram to illustrate the phases of the 5 S's model as shown in the following figure:

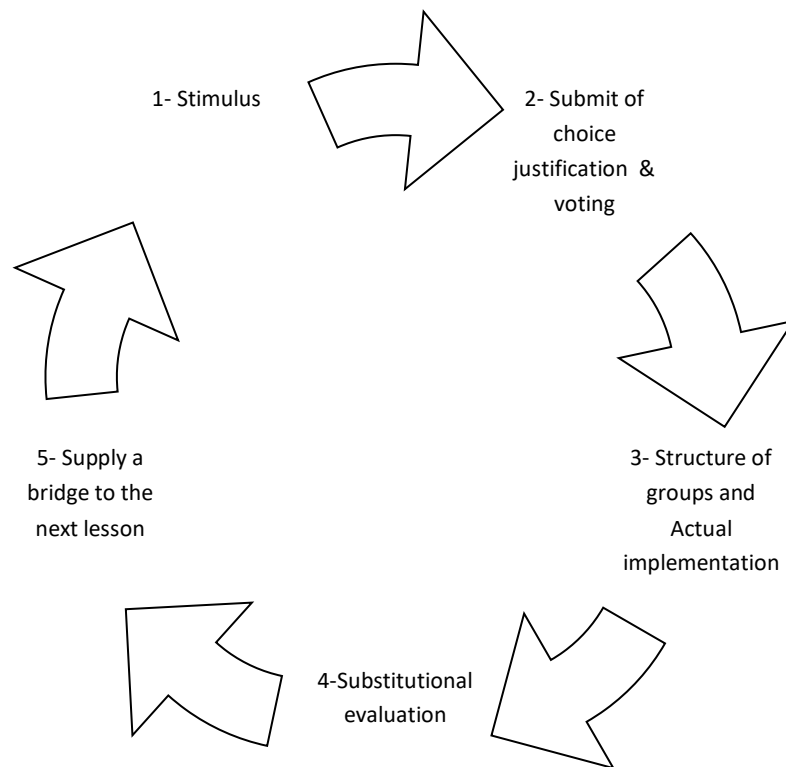


Diagram of the 5 S's model

The characteristics of the 5 S's model:

The 5 S's model is characterized by several characteristics distinguish it from other models, the most prominent of these characteristics are the following:

1. Taking care what is appropriate for learners.
2. Take into consideration learners' preferences.
3. Provides an opportunity for learners to express views and instructional differentiation from several options.
4. It encourages democracy teaching for learners.
5. It achieves the equilibrium between individualism and community in learning.
6. It provides an ambience of fun, relaxation and forgiveness.
7. It authorizes one of learners to announce the inference of the activity.
8. It enables a traditional implementation, e- implementation or both of them.
9. Reverting specific steps as a skill is different from automatic repetition.
10. It depends on alternative evaluation to evaluate the performance of learners.
11. It involves the learners for evaluating each other.
12. It calls for a monthly scientific exhibition to display the achievements of learners.
13. It encourages positive and free bridges of new knowledge to be learned.

The rules of the 5 S's model:

The 5 S's model has five rules as follows:

1. Continuous stimulation of the learners' cognitive, and thinking abilities, not only their spontaneous appearance, inside the classroom, the school and home with cheer of emotion and faith.
2. Teaching based on learners' freedom of choice leads to better learning.
3. The integration of traditional methods with modern methods enriches the process of teaching science.
4. Mutual, equal and equilibrium cooperation between every two learners of all groups. While not relying on the implementation or replication of one activity, but diversification.
5. A comprehensive, diverse and participation evaluation of all parties in the teaching process, including the learners themselves, with the opening up the wide prospects for new learning.

The answer of the second question that states: What are conditions of success and cautions to be avoided of the 5 S's model?

The conditions of success of the 5 S's model:

The researcher proposes several conditions for the success of this model in the teaching of science and in the teaching of the other disciplines, and it is very useful to follow them, which is as follows:

1. Flexibility of the curriculum, allowing for the possibility of submission and delays in the implementation of lessons.
2. The teacher is convinced of the importance of implementing the model and integrating in its phases and steps with learners.
3. Formulate comprehensive and diverse aims in all different learning, without neglecting a particular field.
4. The need to design a traditional and electronic achievement file for each learner, and to work on updating it and the possibility of revising and modifying it constantly.
5. The positive outlook of the teacher to the learner as a human being, and the mutual respect between the learners on one hand and between the teacher and the learners on the other side.
6. Availability of material is essential to the full implementation of practical activity.
7. Availability of basic knowledge is essential to understand work requirements and ability to consciously carry out activities and implement work.
8. Encourage self-reflection thinking among learners to achieve integration into the learning process.
9. The ability to express the opinions and defend it when it weakness or better.
10. Understanding, awareness and sympathy with others and the equilibrium between individualism and community.
11. Wait and do not rush making judgments.

The cautions to be avoided in the 5 S's model:

There are a set of caveats that teachers and learners need to avoid in order to reach the desired aims. Implementing the 5 S's model according to its essence and principles, these caveats are:

1. The teacher chooses soap types that do not suit the different interests among learners.
2. Hurrying to answer questions.
3. Courtesy when expressing an opinion or abstain from expressing it, or refrain from justifying it.
4. There is chaos during the voting process.
5. Bias towards some learners and their opinions and poor equity with the rest of another learner.
6. Superficial interaction among learners in groups.
7. The teacher neglects the recreation for learners, during work or to minimize from forgiveness.
8. Preparation of a formal or propaganda achievement file.
9. Reluctance or subjectivity in learners evaluating each other.
10. lack of interest from teachers for bridging the topics to be voted in the next lesson.

The answer of the third question that states: What are expected learning outcomes from the 5 S's model?

The expected learning outcomes from the 5 S's model:

It is very sincerely that the teacher as general however science teacher in his planning to teach the expected results and learning outcomes, and we hope that the learners achieve some of their, and hope to be inquired, not necessarily all happen and interested in all lessons, topics or activities. But it is necessary to pay attention to them and focus on them during the unit or the during. We propose thirteen outputs. There is an explanation and detailing them:

Understanding:

Understanding is the process of building the meaning of interaction with the text by combining the knowledge and experiences available to the reader and the information contained in the text which the subject of reading and the position of the reader (Caldwell, 2008). For every text, a theme and a purpose are put for this text. Thus, the texts are written to protect a certain interest, that is what legislator seek to achieve it. Even texts are applied optimally must be understood properly, so the most important ways for understand texts understand it with respect to the purposes and interests (Shobaki, 2016). It is therefore necessary to guide learners to understand the scientific text, understand the steps of scientific activity, understand the report, and even understand each word in context or subject matter.

Self- thinking:

The concept of self-control occupies a special status in scientific research and it is one of the most important contemporary psychological concepts. The personality as a dynamic and unified system, it has the characteristics of self-control. There is no doubt that the source of brain control. Human behavior must derive from self-awareness and the exercise of control behavior itself (Habib, 1997). It is therefore necessary to train learners on self-reflection in its different dimensions.

Sensitivity to feedback:

This feedback increases the learner's ability to focus his / her senses in order to absorb what is required and try to reach it through observation, listening, thinking, and continuous evaluation in the learning process, which is important in guiding the learner to his mistakes and comparing his performance to the desired level. The light of the specific objectives gives the opportunity to compare performance with actual performance (Abdul-Jabbar, 2008). Feedback is considered to be a key component in teacher activity for the reflective construction of knowledge. It also makes learners more aware of the competencies that they should reach (Ion, et al, 2017).

Peer assessment objectively:

Peer assessment can become another learning tool. When themselves assessment in a classroom, teachers are exposed to a range of experiences and activities. If these are used as the focus of a following discussion, they are likely to find different ways of improving their own teaching assessment. Their peers are a stimulus which urges teachers to learn from their own experience. If peer assessment is to be introduced into schools, a meeting should be held to explain that it is a self-development process. Further, the process of carrying it out should be discussed. For, instance a teacher invites a colleague to work with him - they agree on which aspect of teaching they wish to tackle - use of questions, learner-attention, use of the blackboard, patterns of classroom interaction and so on they agree on a suitable time for assessment- during the assessment they both collect data on the agreed topic as a focus for- assessment and as the basis for a follow-up discussion after the assessment they meet to exchange opinions and ideas about the aspect of teaching they have examined (Masaud, 2017).

Express of opinions justifies them.

Reflective:

The halving of beliefs and desires presupposes the halving of reflective capacities is sometimes supported by appealing to the idea that the concept of belief is a concept of a mental state which involves a normative aspect. the intelligible relations that obtain between cognitive states and cognitive states open the door for the possibility of normativity without reflectivity. Due to these relations, a learner's beliefs can be successful or unsuccessful from its own perspective even without its conceiving of them through learning processes (Jacobson, 2010). And the reflection of the important learning outcomes of teaching, and depends on the process of observation as a process of science, and have a focus on events and phenomena and experiments, and depends on the process of scientific communication by describing things, events and phenomena, and attention to different elements and analyse it.

Open minded:

Open-mindedness is viewed as socially desirable when individuals encounter viewpoints that are compatible with conventional social norms. However, open-mindedness is viewed in less desirable terms when individuals encounter viewpoints that undermine these norms. The perceived desirability of open-

mindfulness is also influenced by the individual's personal attitudinal convictions. Individuals' appropriateness of open-mindedness when it serves to reinforce their convictions, but devalue the normative appropriateness of open-mindedness when it serves to contradict these convictions. Conversely, normative prohibition of closed-mindedness is exaggerated when a closed-minded orientation threatens the individual's personal attitudinal convictions, but is minimized or reversed when a closed-minded orientation leads these trends (Wilson, Ottati, & Price, 2017).

Independent minded:

In order to ensure future generations of citizens in a democracy understand their rights and are committed to their roles, schools must involve them in the processes of discussions, and express an opinion on a day-to-day basis. The two steps for doing so are using cooperative learning the majority of the school day to utilization students in the basic processes of freedom discussions and utilizing differences of opinion to occur students in the processes of discussions in general issues in society. The conceptual argument that by engaging in the processes of free discussions among lessons and studies for as long as they are in school that learners internalize the interests, attitudes, values, and patterns of behaviour necessary to be involved as citizens (Johnson & Johnson, 2016). Moreover, in a democratic teaching and learning environment, independent minded among learners increasing and the ability to express ideas and opinions freely increasing. In addition to accepting of opposition opinions.

Managing Impulsivity:

The social and emotional difficulties to use intelligent behaviours habitually. While embedding a 'habits of mind approach into the whole-school programme has become popular in many schools. The increase for each of the habits of mind investigated, with a general decline in problematic behaviours. The most prominent reported changes were increased persistence by applying past knowledge to new situations, listening to others with understanding and empathy, improvements in managing impulsivity, and thinking flexibly. Patience in learning and dealing with others (Burgess, 2012).

Listening with Understanding and Empathy:

The students as sentient and social beings, their live-in hope that can be understood when they try to communicate with each other. The teachers strive for better understandings among students. how communication among students involves co-creation of meaning by exploring narratives those expressed by a speaker and those created internally by listeners in efforts to achieve understanding. the extent of these efforts varies from reliance on prejudice at one extreme to deep listening at the other (Peter & Welch, 2013). That leading to deep understanding, clear expression and mutual respect.

Comminating with clarity and precision:

Schooling for Tomorrow providing policy makers and practitioners with tools and insights to address education in more future-oriented ways. The need for balance between the long-term impacts of education and decision-making often

focused on the short term; between imagination and rigor – two central qualities required for futures thinking. The learned including the value of linking futures thinking to knowledge management, cultures of innovation, and leadership development. To achieve positive communication and express ideas accurately (Istance, & Theisens, 2013).

Thinking Interdependently:

The learning is an activity of interdependent students. Much of the communicative and power relating activities of interdependent students take the form of continually iterated patterns. Learning is then understood as the emerging shifts in the patterning of students' communicative interaction. Learning is the activity of interdependent students and can only be understood in terms of self-organizing communicative interaction. Learners cannot learn in isolation. They must interact with each other and mutually benefit in various study activities and home, society experiences (Ralph, 2003).

Learning Continuously:

Continuity in learning is the relating of what goes on within the student with what goes on about him. To help students understand their role in raising self-selection to conscious deliberative action in learning, the knowledge, awareness, understand, and life skills (Hopkins, 2013). Beliefs that learners hold about knowledge and knowing, or what has been termed personal epistemology, are related to learning and achievement in complex ways. These beliefs are also differentiated by discipline (e.g., language, math, science, technology, history) as well as by judgment domains (e.g., personal taste, morality, opinions) (Hofer, 2006)

The answer of the fourth question that states: What are the tasks of learners and the roles of the teachers in the 5 S's model?

The tasks of learners in the 5 S's model:

In this model, the learner performs a series of tasks. The most important of these tasks are:

1. Reflective.
2. Choose of a suitable soap piece.
3. Thinking about the questions rose.
4. Freedom of choice.
5. Justification of choice.
6. Description of feeling.
7. Communication.
8. Free voting.
9. Collaboration in working groups.
10. Exchange of roles.
11. Relaxation.
12. Forgiveness.
13. Writing the report.
14. Preparing the achievement file.
15. Peer assessment.

The roles of the teachers in the 5 S's model:

In this model, the teacher performs a series of roles. The most important of these roles are:

1. Provides a varied soap and cut it homogenously.
2. Encourage the learners to participate.
3. Asking the appropriate questions.
4. Active listening to learners.
5. Motivating the learners to learn.
6. Management of elections and vote, around the name of required lesson.
7. Forming working groups among learners.
8. The revival of learners.
9. Management of a public discussion.
10. Comprehensive evaluation for Learners.
11. Bridging for the next lesson.

The answer of the fifth question that states: What are the procedures of performance in the 5 S's model?

The procedures of performance of the 5 S's model:

The model is executed by following the steps:

1. Choose appropriate aims with regard to the learning fields.
2. Analysis of the lesson to the science processes, scientific knowledge and values of science and environment.
3. Choose the appropriate soap with regard to the criteria type, suitability for skin, smell, texture, color.
4. Chopping the soap types, each piece into four parts.
5. Distribution of soap to learners; each one of them choose one piece.
6. Encourage each learner to rub his hands with a piece of soap.
7. Asking the following questions:
 - a. What is the color of the soap you have chosen?
 - b. What is the smell of the soap you have chosen?
 - c. Describe how you feel when the piece of soap you chosen is between your hands.
 - d. What would you like to be the subject of our lesson today, from the following topics: (a) (b) (c) (d)?

(In the meantime, the teacher presents to the learners the titles of the proposed lessons from the unit study on the blackboard (electronically or traditionally)). Then he is asking them:

- a. What is your reason for choosing this title?
 - b. He is counting learners' voices for selected titles.
8. Write the title of the chosen lesson through majority of learners on the blackboard.
9. The teacher is forming the groups of learners, in which four learners in each group, according to their preference to the soap.
10. Teacher directed the learners to implement the first activity:
 - a. In each group, the learners meet each other's as pairs.
 - b. Every two learners are pretending to pour water on the two opposite them holding the soap, and so on alternately.

- c. Question and answer between the sub's groups alternately, the first step of activity, and the second step of activity alternating.
 - d. The teacher instructs learners to puff on soap bubbles three repetitions.
 - e. Teacher encourages learners to ask forgiveness: ask forgiveness of God Great, three repetitions.
11. The teacher asks the learners to choose someone to announce their conclusion.
 12. The teacher combines the conclusion of each group electronically or traditionally, presents it opposite all learners, conducts a group discussion around it, and revises its best.
 13. Repeat the previous three steps 9, 10, 11 with the second activity and with the third activity.
 14. The teacher helps the learners to write a report, integrate it into the achievement file of each learner, and photograph each other and store the images in the electronic educational file.
 - a. Keep of learners' achievements to presents it in school science exposition monthly in the school.
 - b. The teacher compiles the chick lists for learners about their activities, participation, interaction, and collaboration.
 - c. The teacher encourages learners in each group to evaluate each learner his three other peers.
 - d. The teacher monitors the average of the three evaluations per learner.
 - e. The teacher works as a bridge for subjects to be voted on in the next lesson.

Conclusion

In order to gain a complete understanding of soap bubbles model for science teaching. It is necessary to experimentation of the model in teaching of some subjects of different sciences such as surface tension, chemical reactions and fungi. However, develop the five stages to seven or eight stages and linking them with modern technology in the same time how to employ it with social media, and the impact on the skills of the twenty-first century, and try to inquiry its impact in the other disciplines.

Recommendations

1. To take care of the 5 S's model in the science of topics, subjects and themes.
2. To employ the 5 S's model in teaching in other disciplines such as geography, ecology, engineering.
3. Employing the 5 S's model to develop the achievement, concepts, thinking, present and future skills, ethics.

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