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Modalities of Approaching Active Learning

Mona M. AlHabeeb

The Public Authority for Applied Education and Training \Basic Education Collage \ Kuwait

الملخص :

التعلم النشط هو وسيلة للتعلم بوسائل مختلفة ومن زوايا مختلفة عن تلك التي يوفرها التعلم السلبي. على عكس التعلم السلبي التقليدي، والطلاب عندما تعلم بنشاط واسع هناك تعلم وراء الحقائق والمعرفة. كما يطورون التفكير النقدي، ومهارات الجدل، وحل المشكلات، والقيادة، والمهارات الهامة الأخرى. وهناك العديد من الطرائق التي يمكن تناولها في التعلم النشط، مثل التعلم التعاوني، والتعلم القائم على المشاكل، واستخدام أساليب الحالة والمحاكاة، والتعلم من خلال اللعب، والتعلم القائم على التكنولوجيا. أثبتت الدراسات والبحوث كفاءة عملية التعلم النشط، وذكرت أنها نجحت في أسلوب التعلم السلبي التقليدي وحده. تعلم ممارسة التعلم النشط لم يعد تطبيق نظرية، بل هو الممارسة القائمة على الأدلة .

Abstract:

Active learning is a way to learn by different means and from different angles than that provided by passive learning. Unlike traditional passive learning, students when learn actively broad there learning behind the facts and knowledge. As they develop their critical thinking, argumentation skills, problem solving, leadership, and other important skills. There is many modalities active learning can be approached in, such as cooperative learning, problem-based learning, the use of case methods and simulations, learning through play, and technology based learning. Studies and researches proven the efficiency of the active learning process, and stated that it succeeded the traditional passive learning method alone. Know practicing active learning is no longer application of a theory, it is an evidence based practice.

Introduction and Background

"To teach" is a generic act that could be approach differently for one purpose, which is to convey knowledges, skills, and experiences. Many teachers assume that their role is to teach, instead, their role is actually to help students learn. We are in a rapidly evolving and changing world, and we must keep up with it and learn the variables. As much as it is not easy to learn it is even harder to teach and translate your thoughts in a way your audience will understand what exactly you meant, especially when addressing children. Studies have found that concentration in classroom seemed to decline drastically after 10-15 minutes into the lecture, lecturers have been striving towards teaching mechanisms that sharpens the student's focus and retention rates. Through years, teachers, professors, and researchers tried many modalities to ease this process, and in the past decade there has seen an explosion of interest in the teaching methods variously grouped under the term 'active learning'. For generations, the education system has been based on a simple mechanism, where the student is merely a passive listener. Student partakes no role in the information-delivering process, only receive, a method called a "chalk and talk" that was favored by teachers due to its speed and efficiency. That is until Professor Reginald W. Revans, a research scientist at the Cavendish Laboratories at Cambridge University, introduced "Action Learning". In 1998, Marchese says "Active learning has the ring of a slogan; passive learning is an oxymoron." The lecture is a very efficient way to present information but use of the lecture as the only mode of instruction presents problems for both the instructor and the students, as it is difficult to meet every particular learning style of students in the traditional classroom.

"Active learning is, in short, any learning activity engaged in by students in a classroom other than listening passively to an instructor's lecture" (Faust & Paulson, 1998). Another definition by Oxford dictionary explains active learning as *"an educational approach in which students are encouraged to engage with the material to be studied through activities, such as experimentation, group discussion, and role-play."* In general, active learning is a method in which learning is learner-centered, rather than teacher-centered as in passive learning or traditional lecturing. The idea behind active learning is contained within Confucius's aphorism: *"I hear and I forget. I see and I remember. I do and I understand."* It could be conducted by many ways including cooperative learning, problem-based learning, the use of case methods and simulations, learning through play, and technology based learning.

Mayer (*2004*) emphasizes that *"learning may be best supported by methods of instruction that involve cognitive activity rather than behavioral activity."* The learning activity taking place within the student's brain is the focus in active learning rather than the observed behavior that is a means to that cognitive work. The teacher guides students in these modalities, triggering those cognitive events consistent with desired learning outcomes. As of recently, It is been officially implemented in the Kuwaiti National Curriculum and teachers are being trained to utilize it nation-wide.

The Kuwaiti national curriculum for elementary schools that was introduced in the academic year 2015/2016 depends significantly on active learning, and is meant to acquaint students with the methods of active learning and later apply it to secondary and high school. This process raises questions regarding its competence and effectiveness as well as its impact one new generation.

In this paper, a representation of the relative complexity of different active learning techniques and brief descriptions for each of the activities will be covered.

Development of Active Learning Theory:

The active learning theory evolved over the years to give the current concept of experiential learning and critical thinking. In 1915, John Dewey, an American philosopher, psychologist, and educational reformer whose ideas have been influential in education and social reform, perceived that students learn best from experience.

"The Teacher and the book are no longer the only instructors; the hands, the eyes, the ears, in fact the whole body, become sources of information, while teacher and textbook become respectively the starter and the tester. No book or map is a substitute for personal experience: they cannot take the place of the actual journey" (Dewey, Schools of To-morrow 1915: 74).

More than fifty years back, active learning as a concept was developed. Its root can be traced to action research, a concept and term originated by the German psychologist, Kurt Lewin, in the 1940s (Weisbord, 1987, pp.183-195). In 1945, Professor Revans pioneered action learning theory. The Revans' Formula consist of $L=P+Q$ *(Learning = Programmed knowledge + Questioning insight),* and his low states the following: *"For an organization to survive, its rate of learning must be at least equal to the rate of change in its external environment."*

Also, in 1987, Arthur W. Chickering, an educational researcher in the field of student affairs, and Zelda F. Gamson emphaised that research shows the importance of learning through engaging materials in "Seven Principles for Good Practice in Undergraduate Education"

"Learning is not a spectator sport. Students do not learn much by sitting in classes listening to teachers,

memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives" (American Association for Higher Education Bulletin, March 1987).

The Canadian Centre for Management Development (1994) published a report, *continuous learning*, suggests that *"some of the most interesting and promising innovations in management learning have taken the form of what is called action learning"*

The benefit of active learning is manifested in improving performance, promoting learning, positioning organizations to adapt better in turbulent times, and developing the capabilities of individuals, teams, and organizations. Active learning helps in developing leaders because its simple rules force participants to think critically and work collaboratively.

Principles and strategies of active learning:

Active learning methods focus on encouraging the students to acquire and obtain the information in which they are required to derive, think, connect and cooperate with each other and with the teacher. These modes make learning a cohesive and active process, ideally enjoyable and involves games and fun activities when directed to the younger learners.

In thinking why active learning is better than the direct teaching, the world institute for action learning (WIAL) argues that it is more effective and efficient, and it is being used in a number of organization varying from governments and schools to non-profit and non-governmental organization.

"Action Learning is particularly effective for solving complex problems that may appear unsolvable. It elevates the norms, the collaboration, the creativity and the courage

of groups that solve problems of great urgency to the organization."

Experiences stimulate mental activities that guide the student to meaningful learning of ideas and skills. These thoughts stimulating activities can occur in a wide variety ranging from direct learning to learning by discovery or design projects and other kind of problem solving with or without physical activity in which student *"Do"* something.

The manner of learning that is carried out by adults differ in many ways than that by children; however, there are commonalities across learners of all ages. New knowledge is being constructed by learners based on their current knowledge.

Principles of active learning presented by Barnes (1989) are:

➤ Purposive: the relevance of the task with the students' concerns
➤ Reflective: students' reflection on the meaning of what is learnt
➤ Negotiated: negotiation of goals and methods of learning between students and teachers
➤ Critical: students appreciate different ways and means of learning the content
➤ Complex: students compare learning tasks with complexities existing in real life and making reflective analysis
➤ Situation-driven: the need of the situation is taken into consideration to establish learning tasks
➤ Engaged: real life tasks are reflected in the activities conducted for learning

Cone of experience:

The cone of experience (figure 1) as developed by Edgar Dale, an American educationalist, states that direct and purposeful experiences are the base of positive

congenial education system whereas verbal symbols takes the cone's pinnacle.
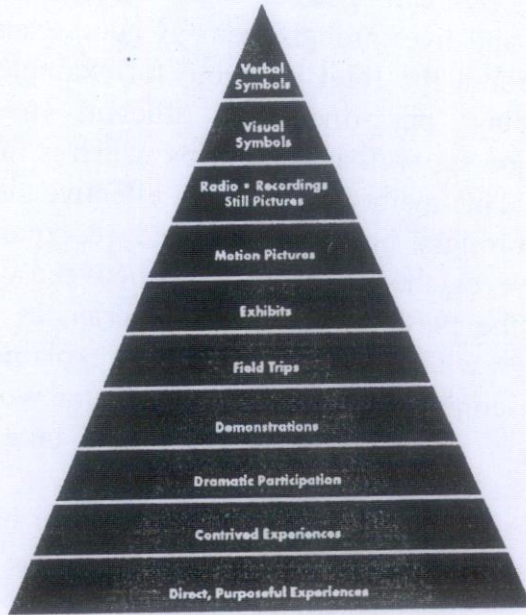
Figure (1)
Cone of experience

Dale interpreted it as *"learning by direct participation with responsibility for the outcome"*, and it indicates to the experiences that the learner encounters that are laid on a spectrum varying from preparing a meal to preforming a scientific experience. The more senses the experience involves, the more able the learner is to comprehend and retain the information. As Dale articulated, the time and place restrictions may hinder the ability to experience these information. While, for example, teaching students how to operate a plane, the students will retain the information more effectively if given the chance to operate one physically, rather than simply lecturing them orally and through textbooks. Some of these experiences can be replicated within the classroom in a cost and time effective
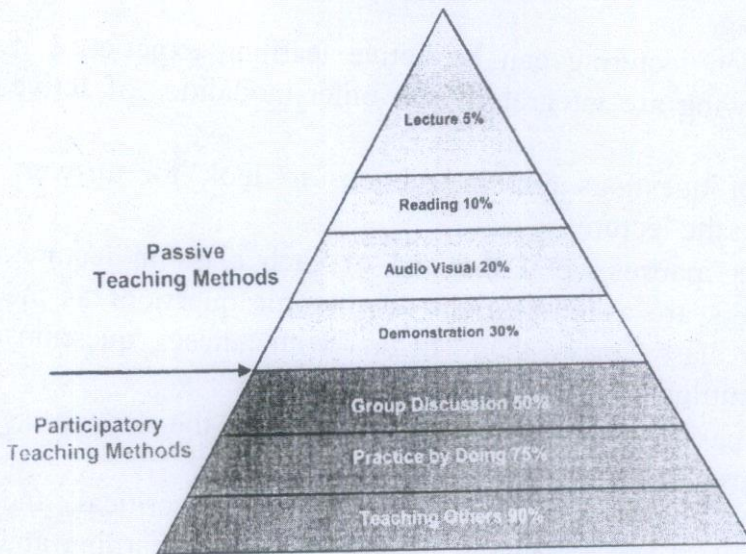
manner to enhance the ability for students to grasp and recollect the given curriculum using dramatic participation, the closest we can possibly get to reconstruct these experiences and live through them. A good example of that is learning about the Iraqi invasion, for example, through a theatrical play performed by students to aid their comprehension, as well as, field trips which is in the 6th tier of the cone. This method is the most effective since students cannot be brought back in time and re-experience these events. However, there are disparities between watching and preforming the play, as the latter experiences more direct encountering with the matter. Dale explained that by dividing the cone to two parts, the spectator would take the upper portion while the performer would take the bottom part.

Dale stressed that the pyramid is not to be taken with the utmost literacy, as it is flexible and is prone to countless exceptions, personal differences being one of them.

Passive and active retention rates:

Another learning pyramid (figure 2) adapted from national training laboratories, bethel, Maine relates and ties the same principals of the cone of experiences but is rather focused on the educational aspect of it. It also divides it into passive and participatory teaching methods, or as we have referred to as conventional and active teaching.

The pyramid also gives percentages of the retention rates of both, with the passive being the top part, it shows only 5-30% retention, while the active teaching methods enunciates 50-90% retention scores.

Passive
Teaching Methods

Participatory
Teaching Methods

Lecture 5%

Reading 10%

Audio Visual 20%

Demonstration 30%

Group Discussion 50%

Practice by Doing 75%

Teaching Others 90%

Figure (2)
The learning pyramid

Techniques of active learning:

In order to create a young generation of thinkers and avid learners, we as educators must rethink our teaching mechanisms and framework and incorporate problem-solving, active learning-based strategies in addition to the traditional textbook and computation means. We must stop thinking of students as "receivers" and rather view education as a collaborative process. Students must learn the reflection of the information they are learning in reality, and not merely understand it. They must know the use and affect of that specific knowledge and be up-to-data.

As presented by resent researches, a greater success is made by instructors who are facilitators, collaborators, leaders, and organizers in helping students prepare for lifelong learning and making them more capable to work in fields requiring new skills and knowledge regularly. As

students are encourage to be self-regulating and self-monitoring.

Even lecturing can be active learning experience if the following are integrated with other modalities of active learning:

- Set of questions and instructions to look for answers within the lecture.
- During pauses or at the end of each class in lectures learners are asked to right down some questions as the next class may then begin with these questions (submitting questions method).
- Summaries the main point or idea of the lecture as groups and present it to the rest of the class.

Active learning facilitates independent, critical, and creative thinking, especially in problem based learning and debates. Also, it encourages effective collaboration in small groups discussions and peer instruction exercises. In addition, active learning increase student investment, motivation, and performance when student asked to brainstorm learning objectives.

In an interview made with Thurnau professors about student engagement at the University of Michiga Prof. Thad Polk said: "it is challenging to keep student interested", he added:" brakes with videos through the class time that are either related to the topic or just for fun or even both are helpful in improving the lecture and bringing student back to concentrate and refresh them". He also thinks that engaging students, their thoughts, background about the topic, and brainstorm objectives and things related to topic and what they learned is really helping. He thinks that the tutor duty to motivate students to learn and make it their responsibility toward themselves. In the same interview, professor Alford Young mentioned that tutors should teach students the way to study and learn. Instead of directly

giving them the information, direct them to it. He even thinks that student feedback about the session they just took is significantly important to improve learning. Another Thurnau professor, Deborah ball, believes that we cannot make the learning for students, but we can give them the tools and the instruction to do so.

Many methods must be incorporated with the lecture material and be balanced strategically. Teachers can use multiple strategies to encourage brain-stimulation. However, active learning requires more time and energy and may be stressful for tutors. Some of these methods can be the following:

❖ **Activities for individual students:**

These activities Often require more time for the instructor to prepare well and are less efficient than didactic learning for presenting foundational knowledge. Also, they may be frustrating for students who are not prepared to participate. However, it helps consolidate information, convert it easily to long term memory, and understand it better and clearer.

1. Submitting questions Students are asked to write down any questions they have at the end of each class. The answers of these questions become the beginning of the next class. This helps in motivating students to listen and provides a way to review course material before moving forward. So, it will connect previous class with present class.

2. Writing a summary of summaries.2-Page summary of an assigned reading is done by each student. Then, students exchange their summaries and each of them writes a one paragraph summary of another person's 2-3-page summary. The resulting summary of a summary can be presented to the class.

3. Writing to determine comprehension "brainstorm", one-two minutes' pause paper Stop in the middle of the lecture, or even in the end or the beginning after introducing the topic and the objectives of the lecture, and ask the students to write everything they know about the topic or sub-topic. A few students would be asked to share their brain dumps. This technique helps students remain attentive and gives the tutor a feedback about the student's knowledge or misunderstandings.

4. Clearest or muddiest point At the end of the class period, you ask the learners "what was the "muddiest point" in today's lecture?" or, being more specific, asking, for example: "what (if anything) do you find unclear about the concept of"....... "?".

5. Just-in-time teaching (JiTT) Students will complete and turn in an assignment on a given topic before the class period. The tutor then reviews his students' work and accordingly plan and adjust the activities, materials, and discussions based on the common errors, problems, and misunderstandings in the students' answers. So, the students' questions, misconcepts, and knowledge gaps guide classroom instructions

6. Student as a teacher (peer teaching) Let each student teach a specific subject to a small group of 5-6 student to reduce stress, failure, and embarrassment a student/teacher may face. It is not a simple presentation, as it should contain a full lesson plan that include objectives, learning outcomes, discussion questions, and forms of practice and evaluation.

7. The "Socratic method" The instructors in this technique test student knowledge by asking questions during the course of a lecture. The tutor chooses a particular student to answer his/her question. If the chosen student cannot answer, another student will be chosen. This method was

criticized because it singles out students and might embarrass them. Also, it favors only a small segment of the class, those who can have an immediate answer. In addition, once a student has answered a question he/she may not pay attention since it will be a long time before the tutor return to him/her for a second question.

8. Quiz or test questions As prof. Thad Polk said in his interview, testing is not just for assessment, but also it significantly improves learning. As to compare a group of students who were asked to repeatedly study a material and then get tested once, with those who were asked to study the same material once and repeatedly get tested on the material they had studied. The second group will retain the material better as the professor said. McKeachie stated that asking questions is the most useful method when approaching active learning, however, teachers tend to rely on it alone rather than incorporating it with other strategies which defeats the purpose. Also, students may be asked to create quizzes and tests by constructing some of or all the questions for the exams.

9. Immediate feedback

▪ Finger signals Learners are asked questions and instructed to signal their answers by holding up the appropriate number of fingers, thus committing them to answer each question on their own. For example, the instructor might say "one finger for 'yes', two for 'no'", and then ask questions such as "Do all organic compounds contain carbon [hydrogen, etc.]?". Or, for multiple choice questions prepared for the overhead projector and have the answers numbered (1) through (5), asking students to answer with finger signals. Testing student comprehension without the waiting

period or the grading time required for written quizzes is provided by this method.

- Flash cards This method is useful in subjects which utilize models or other visual stimuli. For example, the instructor might flash the diagram of a chemical compound and ask "Does this compound react with H_2O?". it can be combined with finger signals.

10. Critical thinking motivators

- The pre-theoretic intuitions quiz This method is used to guide the student to the use and effect of a topic in their life and to reflect it in their practice. It also helps to get their interest toward the topic. The lecturer gives the students a quiz aimed at getting students to both identify and to assess their own view in the beginning of a lecture. After answering the questions, the students should be asked to compare their answers in pairs or I a group and discuss the ones on which they disagree.

- Puzzles and paradoxes Give the students a puzzle or a paradox that present the topic and have them struggle toward a solution.

❖ **Cooperative learning activities**

Although these activities require students to coordinate meetings, communication, and other logistics, and sometimes it is difficult to fairly and accurately assess students' efforts, both individual and collaborative, these modalities are really affective and highly beneficial.

1. Cooperative groups in class

- Note taking and revision After asking students to write a short note, let them exchange their notes and fill in any gaps they identify. That is because the notes taken by students in class are hardly sufficient, so this technique will help them generate complete notes when they review the course material.

- Editing the work of others Have students write short papers, exchange them, and edit each other's work. it helps students to always take the editing process seriously, and give them an idea about the process that the tutor uses to assess students writing.

2. Active review sessions Traditionally, in review sessions the instructor answers his students' questions. Students spend their time coping down answers, while they should think about the material instead. To improve the session and make it active, the instructor possess questions and ask his students to work in groups. After that, they are asked to share the results and discuss any differences and disagreements among solutions proposed.

3. Work at the blackboard According to the concept that students learn more by doing rather than watching, ask students group themselves and step up to the blackboard and solve problems instead of watching the tutor solving them. If space is not enough in the board, papers or computer software can be used.

4. Concept mapping This method works by illustrating the connections that exist between terms or concepts covered in course material. Most terms have multiple connections helping the brain to easily retrieve the concept. It will also help learners in identifying and organizing information and to establish meaningful relationships between the pieces of information.

5. Visual list In groups, students are asked to make a list on paper or the blackboard tutors can use this method when they want students to compare views or to list pros and cons of a position. Tutor may then ask his students to analyze the lists with questions appropriate to the exercise.

6. Jigsaw group project In this technique ask each member of the group to complete some discrete part of an

assignment. When every member has completed his/her assigned task, they should join the pieces to form a finished project. This will prevent putting the load of the project on only one or few members of the group.

7. Role playing, drama, and simulations When students act out a part they get a better idea of the concepts and theories being discussed. examples of this modality are:

- Adopt a role Ask each student or by groups to write an assignment while they are in the role of another person. As it can contain, for example, what would the person do and what reasons would they have for doing it? also, how would that person feel? Have a few students read or act out their writings.

- Understanding audience Let your students write or discuss in one way for one audience and another way for another audience, so that they can understand how different audiences have different levels of knowledge on an issue and have different emotions in a conflict or issue.

8. Panel discussions This modality is useful when students are asked to give presentations or reports as a way of including the entire class in the presentation. When, for example, students are presenting the results of their research into several forms of energy, you might have some of the other students (the audience) role play as concerned environmentalists, transportation officials, commuters, and so forth.

9. Debates It provides an efficient structure for class presentations. Students are assigned debate teams, and each team is given a position to defend. Addition to the use of this method as a way to teach the content and material, it is helpful in developing argumentation skills. Those how are not participating in the debate are the judges. They should evaluate the debaters and record

points that the debaters on each side should have made but did not.

10. Games based learning Many will scoff at the thought of literally playing games in the setting of a class, but occasionally, there is no better instructional tool.

11. Problem based learning It is commonly known as PBL. It creates a perfect rich environment for active learning. It was first adapted in the medical studying field and has been implemented in many law, business and medical schools as well as secondary and corporate training environments. PBLs emphasized that knowledge is constructed and not received, and learners must acquire solutions for authentic problems depending on brain-storming, cooperative work, self-directed work and metacognitive skills.

In a PBL session, students must be in groups, and a problem is presented to students that they are required to give a solution. The problem and duration of the problem-solving process depends on the given problem and discipline.

For example, an elementary science teacher can ask his students how to maintain a healthy flower healthy at home. Students can acquire information by asking a gardener, searching the internet, reading books and booklets and contacting local experts as well as preforming experiments on growing the flower in different conditions and soils. This way, the learner will tend to retain information longer and more efficiently.

12. Visual based learning

- Outlining, flow charts, webs, and concept maps and fish bone method These modalities help students decide the important points and how they relate to each other. Ask students individually or on groups to develop one of these structures. Some forms can be presented to the

class, as they can be shared, discussed, and synthesized into one in class.

13. Group brainstorm Defined the range of acceptable ideas, suggest a topic, and ask questions. Then, have someone, not necessarily the teacher, make a list of the ideas being dumped on the board or overhead.

14. Share-pair

- Discussion Every student and his neighbor or even group of five students or so discuss specific issue. Then share it with the rest of the class, allowing students to teach each other and make it go as snowball, through which a question, an answer, or a concept triggers further questions. The benefit of this method is to make the student talk with confidence about the idea because he/she just had discussed it with his/her group. Another benefit is that it makes it a little safer as the idea does not only represent him/her, instead, he/she say's "in our group we think...". This method additionally helps students to learn how to share the ownership of a point or an idea.

- Think pair share Each student works individually on a problem for a short time in the beginning. After that, students pair to compare, synthesize, and finish the assignment. Later, they report to the whole class.

- Peer review Each student review the work of his neighbor student and adjust it to form a better outcome in this method. And help exchanging thoughts in a deeper method

❖ **Visual activities**

1. Films Visual media, like films, can be used to view important segments, discuss them, criticize it, and reflect it upon. Also, students can be given questions to answer as they watch. Additionally, groups can be established to

discover or examine specific points. Furthermore, tutor may allow students to film their own projects.

2. Overhead projectors or presentation software In your presentation put between the slides some questions and activities for the students. Do not put your notes on presentation software, nor project it or even read it to the class.

3. Demonstrations During interactive demonstrations, tutor can ask learners questions like: what will happen if....?

Research evidence:

Many studies have shown evidence to support active learning. Listed below are some of these studies results:

According to the study that was done by Diant Asmayani in Indonesia, 2014, it was found that there was a significant difference in students' achievement between the students who were taught actively and those who were not.

Another research done by Mary Burn in 2014 resulted in that over 80% of teachers across two Indian states prefer and regularly implement collaborative learning techniques and began the larger journey toward learner-centered instruction for middle school math and science teachers. It results also in a number of benefits for students, including greater levels of engagement, increase confidence, and improve behavior.

Also, a study done by Mustafa K. Alimoglu, Didar B. Sarac, Derya Alparslan, Ayse A. Karakas, and Levent Altintas in 2014 aiming to develop and validate an observational tool for instructor and students' behaviors to determine and compare in-class learner engagement levels in four different class types delivered by the same instructor. The scoring was done using a tool named "in-class engagement measure (IEM)" that range from 1 to 5. This study resulted in that interobserver agreement on instructor and student behaviors was 97.3% and 80.6%, respectively.

Higher median IEM scores were found in student-centered and problem oriented methods such as case based teaching and problem based learning. A moderate correlation was found between instructor and student behavior.

In 2015, Abdul Ganiyu Alasela Amosa and Adunni Suliat Atobtele had done a study in Malaysia that was published in the university of Malaya in 2015. This study stated that it was recommended that teachers take students on field trip so as to promote and encourage active engagement in learning, self-motivation, discovery learning, and learning by experience. They had 25 students as cases and compare their performance with 25 students as controls.

Additional interesting study done by M. C. Sukma and M. Ibrahim in 2016 on 25 eight graders of junior high school on even semester of academic year 2015/2016 by using one group pre-test and post-test design. This study concluded that materials for active learning of guided inquiry integrated bowling campus which were developed have been provided valid, practical, and effective to enhance learning outcome of junior high school students.

Hoellwarth & Moelter research done in 2011 showed that when instructors switched their physics classes from traditional instruction to active learning, student learning improved 38% points, from around 12% to over 50%, as measured by the Force Concept Inventory, which has become the standard measure of student learning in physics courses.

Conclusion:

In conclusion, learning actively is a way to open students outlook not only in the prospective of school achievement, but also in life long performance. It is not what we learn, not the material we acquire information from, it is the way we learn it, the way we receive it that makes a deference. Different modalities where discovered by time and experience. Each modality has a specific environment and setting that will make it most efficient.

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