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DEVELOPMENT OF ANALYSIS AND EVALUATION SKILLS IN A PHYSICS TEACHING THROUGH PRACTICAL WORK.

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ABSTRACT

This research paper addresses how to enhance analysis and evaluation skills in physics lessons using practical or lab works. Analysis and evaluation skills are very important for high school science students that can lead to develop critical thinking also, especially where English is third level language. Practical plays very important role in understanding complex and confusing topics, so integrating physics lessons with teaching practical work can improve significant level of understanding. We have researched and analysis of data after applying practical work in regular lesson and conclusion based on three factors, (a) performance on term-end examination (b) Attitude towards physics/science (c) Awareness and more enrolment in physics in grade-12. We have used Form Two Students Attitude Questionnaire, FTSAQ to get data to justify research question. The study was performed on Students of grade -11(NIS, Chem and Bio, Shymkent, Kazakhstan. Respondent were divided in two groups: (1) Control group (2) Experimental Group. Control group were taught in term-3 with all possible teaching methodologies (interactive lesson, Assessment, Inquiry based learning) except practical work but in other group practical work was included to analysis the effectiveness of integration. Results are exactly as assumption; group with integration of practical work was high in result, attitude towards physics and more interesting subject with less confusion and more problem-solving skills. Approach to solving problems and connecting concept with real life is increased significantly.

KEYWORDS: Practical work, problem-solving skills, attitude towards science, FTSAQ, observing skills, science process skills, integration lesson with lab work.

INTRODUCTION

Students are a nation's future, and scientifically knowledgeable students may help establish a developed society. Because secondary school provides the basis for higher education, it must be as robust as possible. Physics is one of the most essential mathematics and natural science courses. Students who desire to pursue further education degrees in physics or study engineering or medical sciences must have a good background in physics. The emphasis should be on giving secondary students with clear and consistent basic physics topic understanding that they may apply in their future studies, daily life, or research pursuits.

A Physics lab can help a student determine the significance of a theory. It clarifies the fundamental understanding of the topic in the minds of the learners. Students recognise the distinction between theory and application. A physics laboratory can assist a student improve their approach to the topic. Experiments conducted in Physics laboratories teach students how to be patient and meticulous while making observations and calculating assumptions. Lab is essential part in curriculum to bridge the gap between theories and applying knowledge for research, and it is here in the Physics lab that a student learns what it means to be a researcher. The laboratory is aimed in enabling students to learn physics theories in a more elaborative manner with the involvement of its application. The experiments carried out are mostly the ones in coherence with the curriculum.

The laboratory is not a competitive pressure where the goal is to achieve the "correct answer." The goal is to understand how to gather information by looking at reality, not to force reality to fit to preconceived notions. The main thing is to learn to be observant, to truly observe what happens, and to handle this knowledge with the utmost honesty. And to comprehend, or learn to comprehend, the significance of what occurs.

Previously, studies stressed the significance of physics education learning [15]. Physics education laboratories help with 1) expanding one's knowledge, 2) memorising and reproducing, 3) applying, 4) comprehending, 5) perceiving things in a new light, and 6) changing oneself. Some physics teaching lab approaches have been created over the previous two decades [2, 3, 5, 11, 13, 14, 16, and 17]. Students must be completely involved in laboratory activities to gain the manual and mental skills related with learning physics.

The role of the laboratory is in high school physics courses since students must construct their own understanding of physics ideas [1]. This knowledge cannot simply be transmitted by the teacher but must be developed by students in interactions with nature and the teacher. Meaningful learning will occur where laboratory activities are a well-integrated part of a learning sequence. The separation of laboratory activities from lecture is artificial, and not desirable in high school physics [2].

Although no. of research paper suggested that Lab work is one of the most critical parts in learning and teaching physics, some studies [3] gives another viewpoint for low academic results and not efficient understanding of physics is poor content knowledge, while others [4] have found that teachers" a scarcity of educational content physics teaching process is accountable. According to other experts, well-designed teacher education programmers can assist practitioners in building content knowledge as well as pedagogical skills to successfully educate their students. As a teacher and instructors, we feel that subject matter expertise and methodological theme understanding of physics education are prerequisites for effective physics teaching. The objective of offering science students with clear and standard physics subject understanding may be met if content knowledge is supplemented with lab activity.

Experiential work involves the student viewing or modifying actual or virtual objects and materials. Appropriate practicum improves students' perspectives, comprehension, abilities, and enthusiasm of science, as well as their capability to act scientifically. Thus, the scientific approach is stressed [5]. [6] Proposes that Lab activity helps learners build problem-solving abilities and cognitive comprehension. Students learn better in action-based lectures where they may control equipment and apparatus to obtain knowledge of the subject matter. [7] advised that lab work be understood as the method by which tools and components are deliberately and critically brought together to persuade the learner about the reality and validity of the scientific worldview Critical thinking abilities may be acquired by practical work in science, particularly Physics, if applied correctly beginning in high school. Practical workplaces students at the centre of learning, where they may engage rather than be informed about scientific principles. It has proven that if students are to understand the theoretical aspect of Physics taught in the classroom to translate them to real life situations, they must master the techniques of practical aspects [8].

Practical knowledge, as opposed to concepts and theories, refers to information that is related with reality. It might be defined as knowledge gained via the practical application to doing scientific research and education. According to [9]a practical approach is any teaching and learning activity that involves students witnessing or using real items and materials at some point. It follows that knowing Physics is incomplete unless practical knowledge is acquired. According [10] physics is a practical topic. While students in secondary schools have found it incredibly challenging to excel in the subject [11], scientific education is critical to the prosperity of any nation that relies on science and technology.

Kazakhstan has accepted modern trends in the language field. Therefore, Kazakhstan has adopted a policy of trilingual education. The government of Kazakhstan began to change the educational system that was created and implemented by the Soviet Union. The purpose of the State Program (2010) is to increase the competitiveness of education through high- quality and affordable education for the country's population (MoE, 2010). Respectively to the State Program for the Development of Education, the educational program should be improved relying on successful experience in school education of the world countries (Press service of the Prime Minister of the Republic of Kazakhstan, 2018) to enhance the competitive ability of future employees [29].

The significant problem is the demographic crisis in the scientific community. According to statistics, in 2004 the proportion of candidates under the age of 40 years was only 25% of doctors. According to statistics from one of the research centres, the average age of heads of laboratories is 62.9 years, for leading scientists it is 59. The average age of candidates is 55 years old, and for doctors 65.5 years. Therefore, the "rejuvenation" of science is one of the top priorities of its development.

Another problem is the inefficient use of renewal and scientific equipment. In previous years, the Ministry only allocated very modest funds for the purchase of unique equipment for universities and research institutes. However, such equipment is often not used. The Ministry of Education and Science of today is working on a new definition of the necessary scientific and laboratory equipment and the establishment of a system of collective centres sharing research equipment [30].

Countries in Asia and under development around the world and other authorities are improving science education; Physics results in most certified examinations like the West African Senior School Certificate Examinations (WASSCE) have not been satisfactory. (WAEC, 2015; 2016; 2017; 2018; 2019; 2020) since the inception of the Senior High School (SHS) program. According to the reports, most students failed completely or had low grades in Physics more than in any other science subject because they did not perform competently in practical paper, which usually tests the students' ability to demonstrate the skills needed for laboratory practical work.

According to [12] ineffective scientific education is hampered by a lack of proper gear and instructors' incapacity to adapt. Many physics teachers prefer to teach the topic theoretically rather than practically, resulting in learners having unfavourable impressions and attitudes about the subject and, hence rejecting it. According to [13]

Many scientific instructors in impoverished countries are primarily trained in theoretical topic areas, which contribute to their poor management of Physics practical classes. According to the researchers' personal experiences with teaching Physics at the senior high school level in Ghana, many students in senior high schools do practical work in Physics only at the end of their studies, that is, in their final year.

The value of practical work in science is generally recognised, and it is recognised that high-quality practical work fosters student involvement and enthusiasm while also developing a variety of skills, science knowledge, and academic accomplishment. However, it appears that high school Physics teachers will not be able to undertake appropriate practical work with their students in most of the Physics concepts since it is time-consuming. There is also the issue of a lack of equipment and facilities, as well as instructor incompetence and insufficient time allocation, which forces these teachers to use the classroom technique rather than practical work.

The organisation of practical exercises is expected to be done regularly, according to the Physics teaching curriculum [14] and in tandem with the theory from the start of the topic throughout the full duration of study however, due to the above-mentioned issues, most institutions limit practical work to high school students preparing for their final external practical tests. As a result, students are almost never fully prepared to conduct lab experiments prior to the start of their final practical tests. As a result, most students are unable to perform satisfactorily in the practical paper, which is mostly dependent on practical work abilities. If this worrying trend continues, it may lead to a fall in the nation's scientific and technological labour requirements. This study was conducted to identify a solution to this problem.

RELATED LITERATURE AND STUDIES

Literature related to this study was reviewed under the headings: Development of analysis and evaluation skills in a physics lesson through practical work.

CONCEPT OF PRACTICAL WORK

According to [15] successful practical work might help students gain key abilities in comprehending the understanding of scientific enquiry as well as their conceptual comprehension. Likewise [16], agree that practical work has a clear impact on students' academic performance. Although difficult, the influence of hands - on experiences bridges the gap between interactive and mind-on activities [15]. According to [17] the minds-on components of practical work should be enhanced to improve students' grasp of scientific principles. [18] Defined practical science work as a "hands-on learning experience that encourages thought about the environment in which we live." This type of practical labour comprises

However, in the context of this study, classroom teaching is the focus but not fieldwork; hence the wordings of 'practical work', 'laboratory work' and 'experimental work' will be used interchangeably to have similar meaning to minds-on and hands-on learning.

Students can engage with equipment and inspect and observe phenomena in a laboratory during lab lessons. According to [19], there is a substantial positive association among the total quantity of scientific experimental work done in secondary schools and Palestinian students' academic success in physics conceptual and applied courses. The study also found that the extent of this impact varied between 26 and 50 percent for different scientific courses. In the same study, it was discovered that the utilisation of laboratory activity assisted in the development of scientific attitudes in students, which benefited their learning of Chemistry, as well as the development of scientific abilities for critical thinking.

Experiential tasks for learners must be intended to help them build "advanced" cognition skills that enable research methods of working [20]. The desired learning results of doing lab work should be evidenced to learners so that they will be not confused by the intricacy of the lab work while doing it [21]. The Lab work should be well-designed and comprehensive in order to assist students in acquiring and developing the required scientific concepts [22].However, research has found that most practical work in laboratory experimental textbooks is restrictive, with few or no possibilities for open-ended learning, and that practical work can be useless, with students acquiring less scientific in lab sessions [23]This confirms the findings of [24] They discovered that there had been no significant differentiation success between learners either with or without lab activity in combined scientific sessions. Other research, by [25] contradicted the lengthy belief that practical practise provided learners with a more authentic experience in science and motivated learners.

ATTITUDE OF STUDENTS TOWARDS PRACTICAL-BASED TEACHING AND LEARNING OF SCIENCE

Learners' perspectives into certain subjects influence their educational success in the subject. [26] Contend that innate attitudes such as self - interest, opinions, competence, and self-efficacy might influence how learners progress knowledge, such as problem-solving techniques, study skills, and logical analysis with that subject. High school physics exercises have been recognised for their role in promoting students' passion for science and their competence to operate equipment. [27] Discovered that laboratory work increased the practical skills and theoretical understanding of university students in Scotland. According to [28] practical work is an important instrument for strengthening students' scientific knowledge and habits of mind.
[31] Also indicated that practical work forms an integral part in ensuring that learners' in-depth understanding of content during the formative years of secondary school science learning is enhanced. A study by [32] also indicated that a major reason why it is important to develop students' positive attitudes towards science is that attitude predicts behaviour.

EMPIRICAL STUDIES ON PRACTICAL WORK

According to a NESTA survey, 99 percent of lecturers presumed that inquiry - based learning had an impact on students' achievement and accomplishment (NESTA, 2005). [33] Well-organized practical experience can increase students' feeling of ownership of their studying and motivate them. They also revealed that there is substantial proof that laboratory work, when properly conceived, sufficiently scheduled, well instructed, and successfully followed on, provides learners with ways to grow their skills and knowledge that add value to their everyday school interactions. [34] Discovered that learners' sentiments towards scientific research improved dramatically of practical courses. Practical activities foster positive attitudes and interest in science. Lab work provides enhancing the existing such as pleasure and excitement, expertise, and scientific knowledge development, learning about science, and establishing scientific perceptions. Other research studies, however, show that practical work has no effect on students' academic outcomes [35]. As a result, an enquiry into the impact of practical skills on students' academic achievement is worthwhile.

In several regions of the world, technology is regarded as a tool that can aid development. It plays critical and dominant roles in advancing technology, trying to promote country's wealth, promoting healthy, and speeding up industrialisation

However, physics education has been undergoing a crisis. Enrolment in physics courses at all levels is low in many countries. Reasons for this range from: inadequate lower-level preparation, weak mathematics background, lack of job opportunity outside the teaching profession, inadequate teacher qualification as well as possession of below standard pedagogical content knowledge [36]. Many students consider physics as difficult, abstract, and theoretical [37]. The subject is considered devoid of applications in the day-to-day life. Many students find the subject boring, un enjoyable [38]. Interest in high school physics is decreasing, learning motivation is declining, and the examination results are getting worse [39]. In many school settings, little time is allotted for the discipline compared to language and mathematics, the other important subjects (Tesfaye & White, 2012; UNESCO, 2010).

The low enrolment in upper secondary school physics has been linked to a shortage of inspirational and well-trained physics teachers, inadequate laboratory facilities and the accompanying limited exposure to

Training in handling physics practical lessons has been ineffective in many developing countries.

Practical work may be considered as engaging the learner in observing or manipulating real or virtual objects and materials [40].

Critical thinking skills can be gained from practical work in physics if practised correctly beginning in early secondary school. Practical workplaces students at the centre of learning, allowing them to participate in physics rather than being told about it. The desire and eagerness to learn more about what the subject has to offer is developed in this way.

On the ground, however, often these tests are clean, un illuminating exercises whose purpose is frequently lost on the learners. In many countries, practical work is ill-conceived, perplexing, and ineffective. What happens in the lab has less to do with real educators learning science. Teachers typically lead demonstrations, and they frequently miss the point of the demonstration. Small group work is done, but the subsequent discussions about the exercise's purpose are usually counterproductive.
Meaningful hands-on work has always been integrated in a debate and discussion, which necessitates comparing observations and findings to experience and theory. Teachers are central to this exchange of ideas. According to studies, the education of upper secondary teachers positively relates with the achievement of their students in matriculation examinations.

METHODOLOGY

We applied two instructional techniques to Grade -11 (physics group) NIS, Chemistry, and biology, Shymkent in term 3 AY 2021-22. Two physics practical examinations formed the pre-test for the respondents. Two different topics were chosen and to compare the analysis and evaluation skills we had included two experimental works selected for this study. The experimental group instructional technique more focus and included practical work when teaching the topics. Learners were actively involved in setting up the laboratory's equipment and gear during the practical activities. After experiment, the instructor led an extended class interaction and discussion. Before the responders were expected to complete writing the laboratory reports, the experimental protocol, data collecting, manipulation, and analysis procedure were always discussed during lesson. The control group was completely on theoretical training and other classroom learning process without involving in Lab work. Teachers explain the traditional method to teach topics without integration of lab work.

The Learners achievement was administered by term (3rd) result. In addition, all the students were given a modified Form Two Students Attitude Questionnaire, FTSAQ. The questionnaire used a five-point scale to assess attitudes. It consisted of 1-5 scale having strongly agreed to strongly disagree five positively and five negatives. It assessed students' attitudes towards physics. Finally, after final term, the same respondents were followed to see how many had chosen to study physics.

The Form Two Students Attitude Questionnaire (FTSAQ) was used to investigate the development of the attitudes towards identified features concerned with learning physics. The five attitudinal concerns that were investigated were:

A: Ability to understand the topics taught.

B: Applicability of the topics learnt in everyday life.

C: Development of interest in physics after the course.

D: The role of the Lab work in learning of the topic.

E: Overall student interaction when learning in class

Likert-type attitude scale scores were worked out for each of the categories of respondents. The percentages of respondents scoring high, average, and low attitudes were determined. These findings are shown in table 3 below.

RESULTS AND DISCUSSION

Effect of Practical work on learners’ Performance in Term-3 exam.

The Pre-Test scores for the respondents were obtained from the 2nd term end physics exam result. The experimental and the control groups had mean performances of X and X respectively on the pre-Test. These results showed that the two groups were of comparable ability.

The total scores on the were compiled and expressed as a percentage, for every respondent in each of the experimental and control groups. The performances were the Post-Test scores. The mean performance and the standard deviations for each group were determined. The results are indicated in Table 1 below.

Table 1: Both Groups Performances on the Term -End assessment.

Group	**No. of Students(N)**	**Mean result (%)**	**SD Standard Deviation (σ)**
Experimental	28	63.07	7.78
control	26	49.06	18.32

$\alpha = 0.04$; R

The experimental group outperformed the control group in terms of performance. The experimental group had a lower standard deviation than the control group. This suggests that the experimental instructional technique had a positive impact on the respondents' direct understanding of the physic assessment in Term-End exam. Following instruction, the respondents developed a focused viewpoint on the task requirements. Despite the teacher-centred instruction, the big standard deviation value witnessed in the control group demonstrated continuity of diverse reasoning. So it's clearly visible that an experimental group has attended higher results in compare with control group.

The current study's findings are consistent with KNEC (2006), which determined that in national examinations, students who performed well in practical work also performed well in the final physics examination. Uwaifo (2012) discovered a statistically valid link between studies and practical scores across all science subjects. Wasanga (2009) discovered a comparable similarity between practical skills and comprehension of science subjects that also contribute to enhanced achievement test performance. Amunga et al. (2011a) proved that work experience encourages students to take science sincerely. The dedication to implode the prerequisites of the goals of the laboratory session gives rise the learners to assume control of the learning situation and develop an understanding of the requirements of the tasks involved in Lab work.

PARTICIPATION IN THE LAB WORK HAS CHANGED MY ATTITUDE TOWARDS PHYSICS.

The Form Two Students Attitude Questionnaire (FTSAQ) was used to describe the impacts of the student's attitudes towards recognised instructional physics characteristics.

Table 2 Summarises These Findings.

Attitude Concern	Experimental group Attitude score (%)			Controlled group Attitude score (%)		
	High	Undecided	Low	High	Undecided.	Low
A	65	18	17	37	26	37
B	59	21	20	12	63	25
C	71	16	13	17	31	52
D	81	9	10	26	49	25
E	69	21	10	34	38	28

Scores of 4 and 5 on the 5-point likert were considered High, while scores of 4 and 5 were considered Low. A score of 3 indicated an average score, interpreted as being unsure about the attitudinal attribute. Table 2 shows the percentages of respondents from each experimental and control group on each attitudinal concern. When compared to the control group, the experimental group had more respondents who scored "High" for each concern. This implies that the experimental group had a more positive attitude towards the concerned attitude.

According to the table, the experimental group had more respondents (65 percent) who recognised the concepts after teaching than the control group (37percent). When compared to the controls, there were very less respondents in the experimental group (12 percent) who have been unsure if what they comprehended the topics (59percent). When it came to applying the topics beyond the school and into daily life,71 percent of the experimental group felt they could do so sufficiently, comparison to only 17 percent of the control group. Following completion of the course, 81 percent of the experimental group respondents reported a greater scientific attitude, compared to only 26 percent of the control group respondents.

In regard to the role of the physics educator in helping participants to fully comprehend the topics, 81 percent of the experimental group respondents indicated that teachers managed to play a central and significant role. The majority of control group respondents (49 percent) felt that teachers did not provide enough assistance. The experimental group also benefited from student engagement during guidance. In the experimental group, 69 percent of respondents said there was plenty of student-student interaction, while only 10 percent of respondents in the control group said there was enough interaction. This interaction included discussions about the best ways to connect devices and equipment, as well as joint problem-solving at the end of the practical task.

The significance of Chi-square (2) for the distribution of attitudes towards concerns by both experimental and control groups was determined. At 5% level of significance (= 0.05) and 20 degrees of freedom (dF = 20), the calculated 2 value (148.47) is greater than the tabulated 2 value (30.41). This lends credence to the observation that the experimental group developed better attitudes as a result of practical physics instruction. The findings of this study regarding respondent formed attitudes are consistent with the findings of Talisayon (2006), who discovered that practical courses improved learners' attitudes towards science. According to Kim and Chin (2011), practical work is an important tool for developing students' scientific knowledge and habits of mind.

During Term two the respondent's laboratory experience was from two experiments: Hooks law and sound. The individual experiments that the respondents could have engaged in are indicated in **Table 3** below.

	Exp. No	Description	Practical details
Hook's Law	1	Force constant	Finding stretch of spring for several masses added
	2	Making own spring	Winding a wire around a test tube and calibrating the finished spring product.
	3	Springs and masses	Oscillating several masses from springs and finding time for a complete oscillation
Sound	1	Source of sound	Causing objects to make sound
	2	Sound in the three forms of matter	Testing whether sound can travel through air, solid and liquids
	3	Changing sound wave frequency	Group works with string, air columns and water in tall jars

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Table 4: Acquisition of Basic Science Process Skills during term 2.

Group	Physics process skills							
	Observing		Measuring		Classifying		Recording	
	No	%	No	%	No	%	No	%
Experimental	28	86.13	26	76.24	25	89.12	28	84.12
Control	26	19.24	24	17.34	26	18.29	24	20.30

Table 7 shows the percentage of respondents who've been optimistic that they had acquired the necessary science process skills as part of term two practical work. The experimental group outperformed the control group in all of the skills listed. Both the experimental and control groups stated that they enjoyed making and calibrating the springs on their own. However, only the experimental group determined additions due to repeated addition of weights and vibrating springs. The group reported that the additional experiments were both entertaining and educational. Several respondents worked with various wires to create springs of varying strengths. The succeeding computation of spring constants and the period of each spring's oscillation was a challenge that the experimental group accepted at the expense of the control group. Both the experimental and control groups had a great time making various objects make noise. The classification of the quality of the generated sound was completed successfully. However, only the experimental group was able to conduct the experiments involving sound conduction in the three states of matter and intentionally adjusting the noise level and performance of sound made using string tension and air column variation.

Shi et al. (2011) demonstrated that basic science process skills are more easily acquired when learners perform practical work involving springs, which is accompanied by detailed discussions about the nature and purpose of the experiments. In their study involving university and high school faculty, Coil et al (2010) emphasised the importance of science process skills as the foundation of the scientific enterprise for learners. They stated that they learned these skills primarily through experimentation and practical work. They claimed that scientific process skills improved current and future science content. Chabalengula et al. (2012) demonstrated the value of science process skill mastery among elementary school science teachers.

The secondary teachers' performance was accredited to be extra impactful for those who have already practically acquired those. Yandila and Komane (2004) investigated the importance of active pursuit of science process skills in the laboratory and class experiments on constructive learning to understand of secondary school science in Botswana. The procurement of these abilities sharpens the learner's arising capacity to investigate occurrences in scientific settings. These findings are consistent with the current study, which determined that young learners should be provided with wide range and uniformity in practical investigations in order to gain science process skills.

STUDENTS ENROLMENT FOR PHYSICS IN GRADE -12 (NEXT AY).

The present study sought to determine the impact of practical work and subsequent enrolment in the physics class in successive academic years. We have checked for the students who enrolled for the next year Physics in grade 12. This shows students got motivation for the learning the physics in the next year.

Williams et al. (2003) explored how some students are disinterested in physics in upper secondary school classes. They discovered that involvement inside and real inclusion in lab work during secondary school education played a significant role in deciding to pursue the subject in later secondary school. According to Assefa et al. (2008), ensuring engagement in practical skills was rated highly among other treatment for increasing enrolment in advanced physics courses. It piqued students' interest in the subject. Owo eye and Yara (2011) discovered that the rural-urban high school performance gap in agricultural sciences was determined by the availability of laboratory facilities and the quality of practical work done in them. A certain achievement had a massive effect on enrolment in higher-level courses and careers. The current study's findings are consistent with the literature cited. Both emphasise the importance of emphasising practical work to students during their important developmental years of science study and future enrolments in those science courses. A similar link was discovered in the current study for high school physics.

CONCLUSIONS

The study investigated the role that practical work in Development of analysis and evaluation skills in physics learning.

The specific conclusions from the objective's findings are:

Participation in meaningful practical work increases efficiency in the topics where the practical was deduced. Practical work increased students' interest in the subject matter. The successive conversations allow the children to focus their data deception analytical skills. The theories that emerged were based on anecdotal evidence rather than theoretical imposed.

When compared to the control group, the experimental group's attitude towards physics changed significantly. This group was able to verify the claimed experiences for theirself. They had complete control over the pace of the practical. They discovered that they might negotiate meanings, and the subject became understandable. This experience was repeated numerous times throughout much practical work they underwent. The absence of constant exposure to these lab works by the control group left them perplexed about the subject.

The students were likely to garner a variety of useful practical skills. The experimental group improved their physics process skills of observing, measuring, recording, and classifying. Similarly, all respondents said they enjoyed setting up the equipment and apparatus, reading the numerous scale items, and writing laboratory reports. Data manipulation proved to be more challenging for both groups. However, in terms of science process skills and actual practical performance skills, the experimental group outperformed the control group.

Practical experience in physics influenced the respondents' attitudes towards the subject. The enrolment ratio of the experimental group to the control group was. Clearly, if students are exposed to meaningful practical's in earlier secondary classes, their waning interest in physics can be checked and even reversed.

The number of learners enjoys doing hands on work. School children who love what they're doing and are more likely to be carrying that enthusiasm to them and thus be more motivated throughout the course. Participation improves learning because students remember activities they have done more easily, which benefits their long-term understanding of the topic. Learners who merely remember and recall facts struggle to apply their knowledge in unfamiliar situations. Experiential learning and application of practical skills helps students' ability to use information in a variety of ways, allowing them to pertain their understanding and knowledge more readily.

The integration of practical work into the teaching programme quite simply brings the theory to life. The more experience students have of a variety of practical skills, the better equipped they will be to perform well in the practical exams, both in terms of skills and confidence.

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