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PERSPECTIVES ON PRODUCTIVE CLASSROOM PRACTICES IN SCIENCE

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A B S T R A C T

This article focusses on three major areas pertinent to teaching and students learning of science in a productive classroom environment: A) The effective ways of students learning science; B) Students misconceptions in the sciences; and C) Field trips or practical aspects such as, outside-of-school laboratory programs or industrial visits. The misconceptions among students in the sciences are elaborated and sheds light on different ways of resolving misconceptions. The article also discusses relevant aspects that influence on the positive outcomes of a productive science classroom practices such as, effective curriculum, student-centred and inquiry-based learning, scaffolding techniques, work placement programs, pedagogical content knowledge, and students' assessments and feedbacks.

Keywords: science, teaching, learning, misconceptions, assessments, pedagogy, scaffolding, curriculum, laboratory, industry.

INTRODUCTION

Due to enormous technological progress and advancement of this century, and recently the effect of globalisation, science and technology have now become an integral part of our economic, social, and political life (Hurd 2000) yet, science education is currently facing great challenge (Batterham 2000; Kiemer, Gröschner, Pehmer, and Seidel 2015; Tytler 2007) as students' motivation and interest in the sciences are decreasing. In recent years students' interest and motivation in STEM subjects has dropped significantly throughout secondary education (Kiemer et al. 2015). Many elementary school students do not find the science as encompassing the world around them. Both in higher secondary and undergraduate curricula science concepts are taught theoretically and are confined to classroom environment, which does not allow students to perceive and learn science in real-life situation. The almost desperate state of undergraduate education in many countries, particularly in the enabling sciences poses a great concern to future science education and science teaching. The brightest and best minded students are not attracted to scientific careers in part because of the poor rewards in science, and the experiences they endure in schools, do not help to motivate them (Batterham 2000). In order to address those issues a productive science classroom practices can play a significant role and help reverse students' demotivation and disengagement in the sciences.

The essence of productive classroom discourse is aligned with social constructivist philosophy which is always cognitive and encourages students to be critical investigators (Freire 1972). Thus curriculum development should put strong emphases on the way how students can learn, construct and acquire correct scientific knowledge, help them to overcome any misconceptions about scientific content, motivate and create interest providing adequate practical, laboratory or other outside-of-school experiences such as, industrial visit where students can find social implications and practical relevance of their science study. In this context, Kiemer, Gröschner, Pehmer, and Seidel (Kiemer et al. 2015) described that one of the reasons for declining the interest and motivation in the sciences in secondary level is due to the mismatch between students' needs and classroom practices they experience, and hence they suggested by changing students' moment-to-moment classroom experiences through a productive classroom discourse which can

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repeatedly fulfil their needs for autonomy, competence and social relatedness, and lead them to achieve self-determined learning motivation.

Productive classroom practices always put emphasis on catering the students in a best possible manner based on their individual differences and abilities. In a broader perspective, productive classroom practice can help students to construct their own understanding so they can learn science properly, and it helps eradicate any misconceptions in the process of students learning science, motivate students, and enhance their interest in the sciences.

This article discusses three major areas pertinent to teaching and students learning of science: A) The effective ways of students learning science; B) Students misconceptions in the sciences; and C) Field trips or practical aspects such as, outside-of-school laboratory programs or industrial visits. The misconceptions among students in the sciences are elaborated and sheds light on different ways of resolving misconceptions. The article also discusses relevant aspects that influence on the positive outcomes of a productive science classroom practices such as, effective curriculum, student-centred and inquiry-based learning, scaffolding techniques, work placement programs, pedagogical content knowledge, and students' assessments and feedbacks.

THE EFFECTIVE WAYS OF STUDENTS LEARNING SCIENCE

Effective learning can only occur when individuals can construct their own understandings. The constructive views of learning pay attention to concentrating on the cognitive content of the minds of individual learners (McInerney and McInerney 2010) where social and other contextual factors affect or influence the learning process. In order to become proficient and develop an expertise in any domain of education, science for example, five key elements are essential to satisfy such as metacognitive skills, learning skills, thinking skills, knowledge, and motivation. These elements are fully interactive and can influence each other. For example, motivation drives metacognitive skills, which in turn activate learning and thinking skills, and provide feedback to the metacognitive skills; and, such interactive and influencing aspects may lead a person to increase the level of expertise (Sternberg 1998). Since each individual and individual's ability is different, and thus each individual will not be equally and effectively motivated and engaged, hence all persons will not necessarily reach the same ultimate level of expertise.

Students' Skills Development to Learn Science: In the teaching practices of science, teachers at the elementary level generally concentrate on the simple process skills such as, making observations, inferences, predictions, and control variables. Gabel (Gabel 1985) suggested that at the intermediate level, students should be introduced to acquire integrated process, reasoning and complex skills such as, graph construction, interpretation and testing hypotheses. At this level of age, all students including the gifted are in the state of transition from concrete to formal operational reasoning state, and thus require opportunity to explore and exercise their skills. Since many enabling science subjects contain a hierarchy of concepts where one concept builds on another (Gabel 1985), hence teachers need to provide a proper theoretical and practical basis that students can understand and find their interest in the sciences.

Many students at the elementary level cannot classify the materials into the categories of solids, liquids, gases or elements, compounds and mixtures; and students cannot grasp the conceptual understanding of these terms. Science appears as fragmented to many children, and as a result by the fourth grade of their school, children perceive the science as dull and boring, and they tend to avoid the subject (Gabel 1985). Some young children have subconscious fears of science/chemistry which are sometimes transferred to them by their teachers, and many children have never had a meaningful or pleasant exposure to science or chemistry (Greco and Greco 1987). Thus it is necessary that a proper nurturing and non-threatening environment is ensured when the sciences are taught to the elementary school students. In this respect, Gabel (Gabel 1985) suggested that students should be allowed more on observation than reading and listening; conceptual idea need to be taught during any scientific experimentation; macroscopic properties need to be presented more than microscopic characteristics, and both simple process skills as well as integrated science process skills should be taught to students.

Proper Understanding and Motivational Aspects to Learn Science: The abstract nature of the content knowledge in the enabling sciences, chemistry for example, create problem to students for their clear understanding. To explain the abstract nature of chemistry Johnstone (Johnstone 1991) proposed three major phenomena of science that should be taken into consideration such as macroscopic, sub-microscopic and the symbolic phenomena, and these should be integrated in an effective manner while teaching chemistry. However, research found (Gabel 1999) that in many cases and, because of the improper integration of these three phenomena can make chemistry obscure to students' understanding and consequently it affects their learning. Thus to improve students' understanding of science/chemistry it should be emphasised on the maximum effort which are based on both classroom and laboratory practices. The basic emphasis should be given on the way how students can learn science/chemistry, and how to motivate and inspire students to apply their acquired knowledge in real life. Students want to see the science applications in real-life situations and various practical implications such as, experience in industrial settings, dealing with various problem solving issues that can make sense to them. It is important to relate the science to real-life situations, and show the students various practical implications that are interesting and relevant to them. If students are able to know and understand how the sciences are contributing to the improvement of human conditions and environments, then this can provide them a motivational spirit to learn more about sciences.

Students Understanding about Nature and Structure of Science, and Gain Correct Scientific Explanations: Students should learn what constitutes the scientific data that provide information, and how it can be utilised in the process of their decision making. The significance of the decision-making practices among the science students and, how many students generally struggle or lack their abilities in understanding and interpreting the scientific data can be well understood from a research outcome (Sadler, Chambers, and Zeidler 2004) based on students' responses. Students were provided contradictory reports about the status of global warming, and were asked to read the reports and answer the questions the researchers set out. The objective of the research was to investigate students' conceptualisations of the nature of science, and how the students interpret and evaluate conflicting evidence regarding a socio-scientific issue. The authors found that nearly half (47%) of the students lacked adequate conceptions of scientific data (data confusion and data recognition) presented to them. Some of the students comprised of the group were able to recognise data without the ability to describe its use or significance, whereas other students could not even distinguish among data, unfounded opinions and predictions. Thus students are required to build solid foundations in the sciences to enable their further acquisition of scientific knowledge, and the teachers should help the students to become self-explainers considering the culture and context that make sense to them. Students should gain the correct explanation, develop scientific knowledge and skills, and understand the nature and structure of science (Roberts 1982). In order to become future citizens and informed decision makers all those capabilities are essential to be acquired and expected from students.

Cultural Aspects of Science Learning: Students' success in science depends on the degree of cultural difference that students perceive between their life-world and science classroom; how effectively students move between their life-world culture and the culture of science or school science; and, the assistance students receive in making those transitions easier. Students' scientific preconceptions which they bring to classroom can be perfectly logical when it is considered in terms of student's world-view, and therefore, any effort to modify these preconceptions will be ineffective (Jegede and Aikenhead 1999). Effective teaching requires to use the science activities in a way that do not conflict with students' beliefs, or emphasise on activities that attend to those beliefs but provide bridges between them and the scientific content. Thus teachers may play a vital role in bridging the cultural gaps or differences between students' life-world culture and the culture of science or school science, and connect them with the scientific content, and make students' science learning and cultural transitions easier. Students' multi-faceted learning abilities, individuality, cultural and other inherent issues are essentially required to address through productive classroom practices.

MISCONCEPTIONS IN THE SCIENCES

Over the last several decades, researches in science education greatly focussed on and accordingly addressed students' misconceptions in the sciences (Palmer 1993, Tao and Gunstone 1999). Children begin to learn science with preconceived notions about scientific matters where most of these notions are misconceptions, and children often retain their misconceptions (Woods 1994). Misconception is very resistant to change, and it represents a major challenge to science educators

(Palmer and Flanagan 1997) and science teaching. Many students hold misconceptions as they fail to integrate the accurate scientific knowledge with their own personal knowledge of the world; and they view the scientific knowledge being separate and distinct from their personal knowledge (Kyle Jr., Desmond, and Shymansky 1989). Students who hold misconceptions generally find the science is merely a compilation of strange, obscure facts rather than a system of conceptual schemes to understand their environments (Halloun and Hestenes 1985). Students' misconceptions in the sciences are common which cover a broad range of areas and aspects; and in reality it is an inevitable phenomenon that teachers and science educators are constantly facing that challenge to overcome. Researchers have identified a myriad range of misconceptions in the enabling sciences that exist in students' minds.

At the early stage when children are in the process of building their own world-view, they require assistance to learn, construct and understand the scientific knowledge presented to them. If children do not find adequate support and assistance to properly capture the scientific knowledge, it may lead them to develop misconceptions in many contents of the sciences, and that conceived notion of misconceptions may exist in their minds as they progress to the higher grade level in school. Few examples from research evidences are provided here which are related to key concepts of mass, velocity, acceleration, force etc. where the students generally struggle to understand them. Some students believe that speed of an object decreases even though the net force acting upon it is zero. Many students have difficulties visualising and comprehending a frictionless world (Gauld 1998). Some students believe that there is a linear relationship between force and velocity instead of force and acceleration, hence they expect a constant velocity from a constant force (Eryilmaz 2002). Some students struggle in understanding the interaction between opposite forces (Gunstone and White 1981). This scenario clearly indicates that if these problems that students face are not resolved right at the beginning, then there is likelihood that those students may develop some misconceptions around the larger context of "force and motion" where all such key concepts are embedded, and consequently these students may find more difficulties in understanding the fundamental principles, laws and models at their advanced level.

How to Resolve Students' Misconceptions in the Sciences: Students will hold a particular alternative view, and will not change their ideas unless students become dissatisfied with the existing conditions, and the scientific conceptions presented to them are intelligible, appear plausible and useful in a variety of new situations (Posner et al. 1982). In order to eliminate the misconceptions in the sciences, students should be challenged for their misconceptions using proper teaching techniques and instructions along with a constant encouragements to build accurate scientific conceptions. The most effective strategy to circumvent or ameliorate the misconceptions among the students is to apply the scientific principles in a useful way that ultimately helps to resolve misconceptions. Researchers have proposed a myriad range of strategies to overcome misconceptions among the students in the sciences.

Students' conceptual change in any scientific context is more likely to occur if any alternative is provided and presented to them in a plausible manner. The plausibility of concepts being taught to students increases their ability to gain the correct concept if any justification is provided for the ideas behind, which the students already possess. In this respect, Gauld (Gauld 1998) suggested to presenting the historical justifications and illustrations in the process of students' conceptualisation of any important scientific context and convince them in a plausible manner with many propositions and arguments around that context.

If the teachers can present correct scientific view which underpins students' thinking process about any context of misconceptions in the sciences, and relate that view with the real-world situation, it can help students to overcome misconceptions. Gunstone and White (Gunstone and White 1981) studied the comparative effectiveness of a specific conceptual change strategy among the students of different ages for the misconception in "motion-implies-force" using various tests and interviews. It was evident from their research that both year 6 and year 10 groups held the misconceptions around motion-implies-force. Although the students demonstrated their metacognitive ability of the process by describing and reflecting upon their change of view, but a clear indication of conceptual change was observed among them although there was no problem in conceptualising the situations presented to them. Tao and Gunstone (Tao and Gunstone 1999) studied the process of conceptual change among students about force and motion using computer simulation programs and Predict-Observe-Explain (POE) tasks. They found that during the teachers' instruction many students vacillated between misconceptions and scientific conceptions from one context to another which was indicative that their conceptual change was context dependent and unstable. Few students who achieved context independent and stable conceptual change were able to perceive the commonalities, and accepted the generality of scientific conceptions across the contexts. Based on these observations a pattern of conceptual change (from context-dependent to context-independent through generalisation process) was identified, which has implications for instructional practices of teaching science. Students' misconceptions are developed from their experiences and are shaped by a socially constructed common sense ways of describing and explaining the world. This research suggested the necessity to teach and encourage the students to appreciate the generality of scientific conceptions.

The conceptual change discussion is an effective way of reducing the number of misconceptions that students hold, and it significantly improves students' achievements of gaining the correct concept about science, force and motion, for example (Eryilmaz 2002). In this context, Palmer (Palmer 1993) suggested that if the students' understanding of scientific and non-scientific aspects are taken into account, and encourage them to reflect upon if there is any relationship exist between the two aspects, then it may help to eliminate the misconceptions that students hold.

The most effective technique is possibly the combination of observation-based and scientific principle-based approaches. Yin (Yin 2012) demonstrated how to use scientific principles to deal with misconceptions about 'sinking and floating', and emphasised to use the combined observation-based and principle-based approaches. The observation-based approach which involves the POE (Predict-Observe-Explain) activities can be insufficient due to inherent limitations such as, some phenomena of science may be difficult to observe, some observations may be counteracted with other evidences or distorted or can be biased with previously held ideas. The principle-based approach helps students to practice abstract thinking skills and appreciate the fruitfulness of scientific principles. The principle-based approach does not exclude the observation-based approach, and in fact both approaches complement to each other. For example, if the objects involved in the science teaching are available for demonstration, the teacher may employ a POE activity, ask the students to discuss the questions first, and then demonstrate them what happens related to that object. Teachers may then ask the students to examine different predictions, and highlight the advantage of the scientific conception over the misconception. This way observation approach supports the prediction guided by the scientific principles rather than the misconceptions. Through the observation approach, the teachers can challenge their students for the misconceptions they hold by introducing anomalies to the students that help them to actively engage them in POE activities and encourage the students to build accurate scientific conceptions. Students should be guided to develop inferences based on their observations either from memories of previous observations or from an investigation carried out in the classroom. When the students have difficulties in applying the scientific principles to solve problems, the teacher may reteach some contents or provide more scaffolding. Thus the teachers need to be flexible and engage their students in discussion whenever it is possible. Yin (Yin 2012) suggested that the teachers need to design the guiding questions intentionally so that their students can learn to apply scientific principles to solve problems. And consequently the students can realise the limitation of misconceptions and understand the fruitfulness of the scientific principles so that the application of scientific principles becomes as intuitive as their misconceptions used to be.

LABORATORY WORK OR FIELD TRIPS AND RELEVANCE OF LEARNING SCIENCE

Science educators acknowledge the reality for the necessity of alignment of science curriculum design with cognitive and affective goals. Students can perceive the science knowledge as useful and relevant when the scientific topics such as medical, health, environment, energy, material science and industry-based issues are presented to them in a plausible and intelligible manner. Science education research evidently shows that large majority of high school students respond well to science courses if they promote the applications of science, foster human values, and show connectedness with personal and societal issues.

Outside-of-School or Industrial Visits: The outside-of-school laboratory programs are exercised by the selective entry or STEM schools for gifted/talented students at the elementary and secondary levels which are found very effective to inspire and enhance students' interest and motivation (Carlson 1988, Farrell, Pfeil, and Caretto 1988, Howard, Barnes, and Hollingsworth 1989). If the general students are exposed in a similar manner to the outside-of-school science laboratory programs, it may have enormous impacts on inspiring these students and increasing their interest and motivation in the sciences.

Students industrial learning experience not only benefit them to become interested and motivated towards their science learning but this also benefit the teachers to effectively present their sciences to students, and gain professional confidence. Hofstein, Kesner and Ben-Zvi (Hofstein, Kesner, and Ben-Zvi 1999) demonstrated through their research that the students who were exposed to industrial chemistry experience had achieved higher awareness of the social implications of chemistry studies; it helped them to become informed future citizens. The students were interested and opted to take chemistry as future occupational possibilities. The students under the study found the chemistry studies more applicable as this provided them relevant and interesting chemistry classroom learning environment; and consequently students became aware of the differences between the laboratory experiments and the industrial processes than the counter students who had no exposure to industrial chemistry.

Scaffolding Techniques: The scaffolding strategies should always be structured in a way that it promotes student-centred and inquiry-based learning. It was evidently found that when the participative inquiry-based learning approach was introduced within the same student groups, a significant improvement was observed where the students had better interactions and integrative friendships among them. As a result the students were able to come up with reasonable explanations, they recognised and identified the differences of expected and achieved results with errors, students were able to make their own judgements, and at the end, students felt more confident (Seago 2009). Scaffolding and promoting students' learning through the laboratory inquiry process along with the use of digital resources may contribute to the enhancement of students' interest in science. The applications of various computer-based simulations and visualisation-based learning tools along with varieties of digital technologies were found effective (Hilton, Nichols and Gitsaki 2008). A dual mode of scaffolding technique can be more effective in science teaching. In this case, first, prior to visit any industry, the teacher can guide the students through various hyperlinks to the website about the industry and/or process, or show videos to students which are readily available in the educational institutions. Second, the other technique is to provide the opportunity to students to attain hands-on and minds-on experience about the laboratory learning skills which are found in that industry. The students can participate in their own school laboratory conducting and analysing their experiments. This laboratory-based inquiry and learning technique coupled with the visualisation or digital information will enable the students to reflect upon the micro- and macro-level of understandings when they visit the respective industry. The student-centred and inquiry-based learning can thus help students in understanding the concept of science in a molecular level, and help them to effectively handle and experiment, analyse and explain or interpret the scientific data.

Work Placement Program: The author suggests to actively encourage the science students in adopting professional values through work placement programs. Hurd (Hurd 2000) stated that the prevailing general education curricula, particularly in the sciences, which are organised along the traditional disciplinary lines are constantly failing. This is because of its inability in understanding the current practices and culture of science and technology, and overlooking the necessity to integrate science and technology with relevant aspects of life (e.g., civic, work, personal, social and economy). Thus it is evident that the current general education within school or university cannot provide adequate support to students for their preparations prior to enter into the workforce. The employers also expect some skills and experiences from the graduates who can fit to their requirements that help enable the new graduates to quickly adapt with the workplace. Thus through work placement program this can help the students in their development of moral reasoning, professional identity and integrity, and students can be benefitted to adhering to and reflecting on the workplace value systems, and the ethical nature of work practices.

DISCUSSIONS

Teachers need to recognise the importance of social construction of students' consciousness that focuses on motives, values and emotions as part of student diversity, and constantly build trusting relationships with students. A productive classroom teacher should be caring, warm and supportive to students, and let students perceive that their efforts will be paid-off if they are in control of academic outcomes. Teachers should continuously instruct in motivating classrooms, communicate with high expectations about today's work and long-term futures, praise students for their specific accomplishments, use a co-operative learning, and permit choices for their students.

Pedagogical Content Knowledge (PCK): The context-based curriculum helps to increase the relevance of science through the authentic applications of scientific concepts that include social, economic, environmental, technological and industrial applications which are being recognised in the 21st century. In order to maintain effective teaching practice, Kompf (Kompf 1996) described that the science/chemistry teachers must know and use their content knowledge in a variety of ways to motivate students in science/chemistry. Teachers should be responsive to the needs of students, help facilitate students' understanding, and provide challenge to them. Teachers should be aware of the broad spectrum of pedagogical content knowledge (PCK) concept which is composed of: orientation towards science/chemistry teaching, knowledge of curriculum, knowledge of science/chemistry assessment, knowledge of science/chemistry learners, and knowledge of instructional strategies. With the help of PCK teachers are able to interpret science/chemistry knowledge and can transform their class/school, and promote students learning (Kompf 1996). For continuous improvement of the PCK, it is necessary to facilitate a feedback mechanism between all facets of PCK, and constantly reflect upon them. This way PCK can become a reflective tool to self-monitor and evaluate teachers' own learning and professional growth; and, at the same time, students can be benefitted. The application of PCK can help the teachers to address and overcome the misconceptions in the sciences.

Students' Assessments and Feedbacks: The interpretation of curriculum and assessment affects the daily decision making in teaching and learning within the diverse contexts all around the world, and are constantly changing or shifting (Ewing 2010). Brady and Kennedy (Brady and Kennedy 2012) described that, assessment is context dependent, and can shape its practices. The contexts should be student-centred and classroom-based where it takes place on a daily basis, and in the broader social and political context, in which schools are embedded (Brady and Kennedy 2012).

A range of assessments are suitable for the science students such as, continuous assessment with formative feedbacks (Williams, Johnson, Peters, and Cormack 1999) and standard or criterion-referenced assessments (Brady and Kennedy 2012), school-based assessment, self-assessment by peers. Although currently, standard or criterion-referenced assessments are most popular (Brady and Kennedy 2012) however, teachers may intend to shift to a more authentic and flexible approach which is entirely depends on the choice of teachers involved. The values, merits and practices of authentic assessment depends on the culture of classroom, school, pedagogical approach, expectations, standards of performances, and students' self-critical judgement capabilities (Williams, Johnson, Peters, and Cormack 1999).

Feedback to students constructs cognitive scaffolding as well as dialogical pattern of discussion taking place in the classroom. Teachers should avoid the type of feedback to students which allows only one-way communication where the teachers are the knowledge purveyor and the students are the recipient of that knowledge conveyed by the teachers. The feedback process should be more interactive and facilitative which promotes and scaffolds students' thinking, and frequently produces dialogical discussions among the lesson students studied (Siddiquee and Ikeda 2013).

CONCLUSION

In science teaching it could be more effective of using a student-centred and inquiry-based learning than the scientist-centred approach. Because student-centred approach and inquiry-based learning can promote the applications of science where students respond very well. It enhances students' motivation and engagement, students are able to handle various problem-solving issues, and it help improve their decision-making abilities. Students gain higher awareness of social and practical implications of their science studies. It fosters human values and connectedness with personal and societal issues; and, helps the students to become future informed citizens, and take responsibility. Emphasis should be given on the development of students' metacognitive skills, learning skills, thinking skills, knowledge, and students' motivation to develop expertise in science. Teachers may pay more attention to cultural differences between students' life-world culture and the culture of science or school science, and understand the necessity to connect them with the scientific content which helps students in their science learning and cultural transitions.

In science teaching students' misconceptions in scientific contents and students' ability to build correct scientific conception with their own world-view without error always remain as a challenge. This article explored and discussed the misconceptions, and various research outcomes found in the area of sciences. The article discussed various teaching and learning techniques to overcome students' misconceptions in the sciences. Researchers have identified a myriad range of students' misconceptions in the enabling sciences and suggested various options and ways to overcome them depending on the nature and context of the misconceptions students hold. The application of scientific principles in an effective way may help to eliminate the misconceptions among students and, the combination of observation-based and scientific principle-based approaches are found to be most effective.

The article emphasised in-house practical/laboratory activities as well as students' exposure to outside-of-school laboratory programs or industrial visits, and discussed their benefits. Student-centred and inquiry-based scaffolding techniques may be applied to promote students engagement, and to enhance their motivation and interest in science. A dual mode of scaffolding technique could be more effective to link students' learning experiences gained from the industrial visit, and students may reflect on their own learning to understand the real-world applications of science, and hence find the relevance with their science study.

The article discussed pedagogical content knowledge (PCK), their applications and benefits. Teachers may adopt any assessments that suit their own pedagogies, teaching styles and techniques. The interactive and facilitative feedback to students is very effective which promotes to scaffold students' thinking and frequently produces dialogical discussions among the lesson students studied. The work placement program may help students to understand and appreciate the ethical nature of work practices and gain professional integrity before they graduate and enter into the workforce.

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