

STUDENTS' PERCEPTIONS OF THEIR SCIENCE TEACHER'S BEHAVIOUR AND HOW IT AFFECTS THEIR SELF-EFFICACY: A QUALITATIVE ANALYSIS

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ABSTRACT

The purpose of this paper is to recognize the influence that teacher behaviour has on students' perceptions of their science classroom environment and on their self-efficacy. The focus is to present, analyse and evaluate the qualitative data that were collected from secondary school science students in Australia. The impact that teacher interpersonal behaviour has on student learning is well documented. It is also understood that students are primarily responsible for their level of engagement in classroom activities. However, the extent to which they perform and whether they enjoy their learning environment can be attributed to a combination of factors. Bandura (1977) promotes self-efficacy as the cornerstone of self-belief and suggests that *verbal persuasion* can determine the level of commitment students exert towards a particular task. The qualitative research entailed interviewing ten percent of the students who completed the *Questionnaire on Teacher Interaction (QTI)* and the *Students' Motivation, Attitude and Self-Efficacy in Science (SMASES)* questionnaire. Ten research questions were constructed based on the two instruments and in small groups, the students elaborated on factors that they believed affected their learning. This study highlights the fact that the manner in which teachers communicate in science classrooms does play a significant role in affecting students' levels of self-efficacy. It suggests that teachers should use appropriate behaviour to create an inviting classroom environment and ultimately enable students to reach their academic potential.

Keywords: student self-efficacy.

SELF-EFFICACY

Self-efficacy is referred to as 'people's beliefs about their capabilities to exercise control over events that affect their lives' (Bandura, 1989, p. 1175). Considerable research on self-efficacy has been conducted since Bandura introduced the concept, and significant findings have been established in a variety of fields. Noteworthy studies regarding self-efficacy and behavioural outcomes in society have been investigated (Bandura, 1982; Schunk, 1989). Areas of interest that have benefited from self-efficacy research include athletics, psychology, psychiatry, medicine and education. The plethora of topics include phobias, depression, smoking, teaching, academic achievement, goal setting, social comparisons, college students' choice of majors and career choice.

Extensive research has also linked self-efficacy to science achievement (Bandura 1997; Pajares 1996; Pintrich & De Groot, 1990) and to science self-efficacy (Kennedy, 1999; Ritter, Boone, & Rubba, 2001). Zeldin and Pajares (2000) explored the impact that self-efficacy had on women's decisions to pursue careers in mathematics, science and technology.

Students are primarily responsible for their level of engagement in classroom activities; however, student involvement in class activities can be attributed to a combination of factors, in particular, self-efficacy. Self-efficacy acknowledges a person's belief that one can accomplish a certain goal. Thus, expectations can influence one's choice in resultant behaviour and the amount of energy exerted on a particular task. It is plausible to assume that teacher behaviour and the classroom environment created, has a distinctive influence on student self-efficacy.

Social Learning Theory and Self-Efficacy

Albert Bandura is the most widely recognized theorist in relation to social learning theory and self-efficacy (Bandura, 1977; 1986; Bandura & Locke, 2003; Schunk, 1995). He suggested that success is the cornerstone of self-belief and, therefore, can determine one's level of achievement. Bandura (1986) viewed:

Those who perceived themselves as highly efficacious are inclined to attribute their failures to insufficient effort, whereas those of comparable skills, but lower perceived self-efficacy ascribe their failures to deficient ability. (p. 395)

This important comparison assists in understanding the processing of students' interpretations of performance levels and expectations of oneself in the science classroom. Schunk (1995) stressed that students who do not succeed, do not necessarily maintain low self-efficacy if they believe that they have the capacity to perform better. Thus, regardless of student academic ability, the teacher becomes the catalyst in directing levels of student self-efficacy.

Bandura (1986) clarified the meaning of self-efficacy judgements as being concerned 'not with the skills one has but with judgements of what one can do with whatever skills one possesses' (p. 391). Thus, when a student judges their own capability of accomplishing a given task, their analysis has the potential to influence their thought processes and related emotions that can determine their performance. Bandura and Locke (2003) highlighted the fact that self-efficacy beliefs 'affect whether individuals think in self-enhancing or self-debilitating ways, how well they motivate themselves and persevere in the face of difficulties, the quality of their emotional well-being and their vulnerability to stress and depression, and the choices they make at important decisional points' (p. 87).

Bandura (1997) believed that success can be determined by self-belief. Social comparisons by students in classrooms are inevitable, thus, students' levels of self-efficacy play an important role in motivating them to want to actively participate in classroom learning.

Social Cognitive Theory and Self-Efficacy

Perceptions of one's capabilities brought about by self-reflectiveness are central to Bandura's (1986) social cognitive theory of self-efficacy. He believed that by reflecting on one's actions, individuals can self-evaluate and respond by changing how they think and their subsequent behaviour. Bandura (1986) also attested that people formed their self-efficacy perceptions from four sources. Firstly, *mastery experiences* are interpreted as results of one's past performance. Thus, strong self-efficacy is formed when a person experiences previous success and in contrast, repeated failure lowers self-efficacy. *Vicarious experiences* are formed by students when they compare themselves to peers whom they believe have similar academic expertise. This type of comparison enables students to regularly monitor their level of self-efficacy against students who they believe they equate to academically.

The third factor that is believed to determine student self-efficacy is *verbal persuasion*. This technique is performed by teachers who endeavour to convince students that they have ability and skills to be able to succeed at a certain task. Thus, a teacher's ability to encourage students can influence the level of self-efficacy that a student acquires. Researchers have noted that it is easier to weaken self-efficacy beliefs through negative appraisals than to strengthen them through positive encouragement. The final factor that can affect self-efficacy is the *physical and emotional state* of the student. Typically, students who are stressed and enter the classroom with a negative mindset would display more self-doubt and display low levels of self-efficacy. On the other hand, students who are optimistic, have the ability to generate higher expectations of themselves and ultimately acquire higher levels of self-efficacy. Thus, Bandura's social cognitive theory highlighted the fact that people are more likely to engage in tasks where success is imminent and less likely to pursue tasks where failure is most probable.

Curriculum design can also determine the level of self-efficacy students acquire and display in the classroom. Students' self-efficacy levels may differ from class to class, it is, therefore, essential to taper the curriculum in order to encourage all students to involve themselves in active classroom learning. As highly efficacious students are more likely to be independent learners (Pajares, 1996), the curriculum needs to cater for a variety of learning needs and the varying levels of self-efficacy in the classroom. Jinks, Lorschach, and Morey (2001) concluded that 'teachers need to provide small concrete experiences in the domain that requires self-efficacy enhancement. As success grows, so should the sophistication of the task' (p.4).

Self-efficacy has also been deemed to influence cognition in four ways. Maddux (1995) revealed that levels of goal setting are higher for people who have strong levels of self-efficacy and they, therefore, commit to their goals with more determination. Secondly, self-efficacy beliefs influence one's strategies for attaining set goals. Thirdly, they influence the development of rules for predicting and influencing events. Finally, self-efficacy in problem solving influences the efficiency and effectiveness of students' problem solving skills.

Student Self-Efficacy and Teacher Behaviour

Teacher credibility and respect are also important factors that can establish effective levels of student self-efficacy. Thus, teachers who possess a confident and self-efficacious manner surely have a significant positive impact on student self-efficacy. Bandura (1986) revealed that efficacy beliefs vary between individuals and will actually fluctuate within an individual for different tasks when they have similar ability. Schools should be aware that student self-efficacy decreases as students progress through school (Pintrich & Schunk, 1995). Thus, if levels of self-efficacy are able to fluctuate then the role of the teacher becomes central to this issue. Teachers should be the catalyst for inciting students to strive for higher levels of self-efficacy in order to realize their potential, develop their confidence and ultimately improve their academic achievement. Receiving constructive feedback from teachers can provide significant efficacy information that a student relies upon to develop their self-belief. Just as self-efficacy levels can be raised, they can also be lowered, thus, teachers have an enormous responsibility to ensure that students are provided for by creating an inviting classroom environment that nurtures their personal learning needs. Teachers should also be constantly monitoring their own classroom performance and the manner in which they conduct their lessons. Due to the fact that self-efficacy has the capacity to direct productive student learning, verbal comments by teachers coupled with their interpersonal behaviour can have a considerable impact on student self-efficacy over the years.

Bandura (1994) viewed the school environment as an agency for cultivating cognitive self-efficacy. He viewed the efficacy beliefs of schools as a whole to be important in creating positive learning environments that are conducive to encouraging efficacious students. He identified that 'teachers' interpretations of children's successes and failures in ways that reflect favourably or unfavourably on their ability, also affect children's judgements of their intellectual efficacy' (p. 9). However, Bandura (1986) also attested that high self-efficacy in one setting does not guarantee high self-efficacy in another. Bandura (1994) also believed that students with low self-efficacy tend to avoid difficult tasks, however, if they do attempt them they will give up more easily than students with high self-efficacy. In fact, he believed that staff belief systems can promote academic success and can directly control the climate of the school as a social system. He is quite critical of some processes in school that seek to enhance students' performances, but can inadvertently demoralize students and lower their self-efficacy. He believed that situations such as 'ability groupings which further diminish the perceived self-efficacy of those cast in the lower ranks' (Bandura, 1994, p. 10) to be quite detrimental toward student progress. He stressed a need for self-comparison appraisal rather than social comparison, where students compare their rate of progress to their personal standards rather than to the performance of others, thus, raising perceived capability.

METHODOLOGY

This study investigated students' perceptions of their science teacher's behaviour and its effect on student self-efficacy in science. The research was conducted in a private girls' college in Brisbane, Australia. The school's population was approximately 520 students and they were of varying socio-economic background. The study entailed collecting data from 313 students from the 12 classes of junior (year levels 8, 9 and 10) science, that is, the classes of five female science teachers including the researcher's classes. Students who completed the two questionnaires the QTI (Wubbels, 1993) and the SMASES (Reid & Fisher, 2008) were studying various topics in science. However, only an analysis of the qualitative data is presented in this paper. Fraser (1991) deduced that qualitative research complements quantitative information in that it provides additional information on student perceptions of the classroom psychosocial environment.

Ten percent of the students who answered the questionnaires from each of the 12 classes, therefore 31 students, were randomly selected to partake in the collection of the qualitative data. These students were interviewed in small groups and their opinions were recorded and transcribed accordingly. The ten questions were formulated from the QTI and the SMASES and three questions were specifically designed to extract students' perceptions about the effect their science teacher had on their self-efficacy. Thus, the qualitative data were used to aid the interpretation of the quantitative data. It assisted in the understanding and explanation of contributing factors that can affect students' perceptions of how their level of self-efficacy affects learning of science. Responses that reflected common trends and opinions that were considered to be worthy of interpretative analysis were recorded for elaboration and are presented in this paper.

RESULTS AND DISCUSSION

This qualitative research involved obtaining direct feedback from thirty-one students who were interviewed in small groups about their self-efficacy in science. They were specifically asked to comment on their perceived level of self-efficacy in the science classroom and whether they thought their teacher played a significant role in determining their level of involvement in the learning process. However, they were also encouraged to comment on their classroom environment and whether they thought particular teachers made the classroom a more pleasurable place to learn. The questions posed to the students clearly sought to identify their opinions and interpretations of their science classroom, their self-efficacy and factors that affect their learning. They also assisted in identifying common perceptions held by students in different classrooms.

Perceptions of Science Classroom Environment and Teacher Behaviour

Students were initially asked questions that endeavoured to seek information regarding their perceptions of their science classroom environment and whether it was determined by their teacher. This proved to be advantageous in gaining an understanding of how the students generally viewed the atmosphere in their classroom. The questions posed were, 'Do you think your science classroom environment (atmosphere) is influenced by your teacher's interpersonal behaviour (the way in which he/she speaks and relates to the students)?' The second question that involved a reflection of the science classroom environment was, 'Is your science classroom a pleasant place to learn?' Students viewed these questions as an opportunity to air their views and responded quite positively in relation to their teacher's interpersonal behaviour and its effect on classroom environment.

Yes, she interacts with students pretty well and is always encouraging us to be inquisitive.

When she came into the class it was all good, she was really kind of bubbly, but then she started losing control of the class and everything and no-one started paying attention. After a few days we all kind of understood that we could get away with things.

The students identified the fact that there needs to be a balance between a teacher adopting a pleasant classroom manner and at the same time maintaining a firm control of classroom behaviour. Students also revealed negative views about teachers who used an aggressive classroom manner and, in turn, made students quite passive in the science classroom routine.

But when she's kind of yelling at us, you kind of just zone out a bit and don't want to go to the next (science) lesson or do the homework or anything that she's asking you to do really.

Students were responsive to lessons where a positive learning environment was created when teachers incorporated experiments into the curriculum on a regular basis. However, they more easily identified situations in relation to teacher interpersonal behaviour that created a negative classroom environment.

There was a really negative atmosphere, like we didn't want to be there, we were too scared to ask questions, because she would be like 'you're just stupid' or she would point you out, she never let you ask questions.

Students were quick to highlight features of teaching techniques that inhibited their learning and made them judge their teacher's interpersonal behaviour on a regular basis. This in turn, led to negative impressions of particular classroom environments being formed.

Numerous students found their science teachers to be pleasant enough in the classroom. Students were very aware of positive body language forwarded by the teacher and the teacher's general persona.

She always had a smile on her face as soon as we came into the classroom, we got into work and it wasn't boring she made it fun to be there and everyone enjoyed it.

I think the teacher's interpersonal behaviour did affect the classroom environment. It made me want to come to science, even although I didn't like science. I think I enjoyed the class more than I did the subject.

Students believed that when teachers lacked classroom control, it interfered with their learning and then students adopted a very casual approach to the subject. They became frustrated with teachers who could not explain

things clearly, and with those who moved on to other topics too quickly. They believed that this added to their confusion in understanding the knowledge component of the course. Students also reflected on the lack of positive feedback from a teacher as a determinant of the classroom environment. Responses revealed the sensitive and emotional sides of students, who often sought positive reinforcement from their teachers regarding their efforts.

She rushed all the time and she didn't really explain things properly. She never congratulated you, or said good work, keep it up, she just put you down all the time.

Another student was perturbed about the rate that concepts were taught, causing students to flounder in the classroom, yet they were reticent to bring this to their teacher's attention. Students found some teachers to be intimidating and consequently were too scared to ask questions. They were not receptive to personal comments that insinuated that a student had minimal ability in science.

I have a friend with learning difficulties and she (the teacher) put her down and called her stupid then everyone was scared to go to science because they thought they would be put down as well.

Students were very protective of their peers' feelings, believing that the manner in which a teacher spoke to students determined students' attitudes towards the teacher and consequently their self-efficacy. Students were most critical of teachers who spoke to them in a condescending and aggressive manner.

She spoke to the class like we were expected to know what she was on about and I didn't. So yes it (teacher interpersonal behaviour) did affect the environment.

Student Self-Efficacy in the Science Classroom

In relation to student self-efficacy in the science classroom, the questions posed included, 'Do you believe that your teacher's interpersonal behaviour affects your self-efficacy (self-belief in your ability) in science?' 'Do you believe that students work harder in science depending on who they have for their teacher?' and, 'Is your teacher encouraging of your efforts in the science classroom?' Students' impressions of their self-efficacy levels appeared to be directly influenced by the type of feedback, if any, they received from their teacher.

I thought I was doing quite well, because after class she'd come up to me and say, 'Oh you're doing really well, you're working really hard and your grades are going to improve.'

I think she made everyone feel equal. She didn't treat anyone as if they were dumb. She treated us all the same. She made me feel equal and worth teaching.

Student opinions also unearthed almost a payback type routine in relation to justifying students' classroom behaviour.

She never gave you positive feedback. So we thought, she doesn't give us attention, so what's the point of paying attention in her class.

However, students appeared to be quite responsive to teachers who did not make them feel academically subordinate.

If we didn't get something, she would explain it until we got it, she didn't make us feel dumb or anything.

This is surely one of the most influential factors on productive student learning, letting the students know that they are worth teaching. In turn, they become more enthused and less inhibited in their quest for knowledge in the science classroom.

I wanted to work for this teacher, she made it interesting for me, and when I'm interested, I'll get a better grade because I'm willing to learn.

Teachers were generally referred to by students as good if they directed students' learning. Students were very critical of teachers who could not explain things clearly; whether it be the content aspect of the course or the lack of instructions they received for practical work. Students' self-efficacy appeared to deteriorate because they could not understand the set task and gradually became increasingly doubtful about their ability.

I think my self-belief did go down throughout the course. The things she said didn't make sense, so we couldn't do the experiments properly. And then she'd move on to the theory which no one understood in the first place.

It became evident throughout this research that students were very responsive to teachers who were positive and encouraging. They noted that their grades improved as they were more inclined to work for someone who displayed genuine empathy. They appreciated teachers who did not humiliate students in front of their peers. They also referred to teachers in a positive light when they focused on positive efforts made by students in the classroom.

She would come over and help you one on one, because in front of other students I wasn't that confident. She didn't focus on the negatives...she made me feel a lot better about myself.

In contrast, students were adamant that they can perceive when teachers did not want to assist them.

Some teachers don't want to help you and when they don't want to help you, you don't want to do any work (for them).

As well as teachers influencing students' learning, students also recognized the fact that if their peers were hard working, their work ethic would influence their efforts in the science classroom.

Teachers have to be nice, they've got to be able to explain things properly to you and they've got to be able to control the class.

CONCLUSION

This research has highlighted the importance of student self-efficacy in the context of science education. It should provide avenues through which educators can examine students' self-beliefs about their capability and then apply their findings to valuable educational practice for all students. It is apparent that teachers should focus on improving students' self-efficacy in order to further their future involvement in their science classes. Ultimately students' enjoyment of school and subsequent success is more likely to follow if their level of self-efficacy is raised. The presentation of the qualitative data has provided a platform for revealing students' perceptions of their self-efficacy in the science classroom. The study ascertained that students believed that their teacher had an important role to play in influencing student self-efficacy and learning science. Generally, students viewed their science teachers to be amicable and the classroom environment to be quite pleasant. They identified the fact that students are more receptive to learning if the environment encouraged student involvement. Thus, they inferred that a teacher's classroom manner significantly contributes to the classroom environment.

Students were most responsive to teachers who showed empathy in the classroom, who had firm classroom control and a positive, confident and inviting manner. They viewed the teacher's capacity to sense when students were not coping academically in class as an important aspect of teacher interpersonal behaviour. That is, they identified with teachers who positively reinforced students' efforts. In comparison, they did not respond well to teachers who could not explain the content clearly, those who were abrupt and those who made students feel threatened and therefore, apprehensive to ask questions in class. Teachers who showed aggression tended to make students feel isolated in class and caused students to become quite indifferent to participating in the lesson.

Finally, students felt that if they were prematurely judged by teachers regarding their academic ability, their self-efficacy declined and they were very reticent to exert themselves in set tasks. Students believed their self-efficacy was influenced by direct feedback that they received from their teacher. That is, the teacher proved to be of significant importance in building and shaping students' academic self-efficacy by the way in which they communicated with the students. Ultimately, science students believed that their self-efficacy was positively

influenced by teachers who displayed leadership, helping/friendly and understanding behaviours in the classroom.

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