

A Proposed Questionnaire to Measure Student Motivation and Intention Toward Learning Science

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Introduction

It is acknowledged by many that there are significant challenges for students when encountering science as a subject. Motivation towards learning about a subject and towards learning in general can strongly influence student intentions to choose that subject and even how well that student may perform. To attempt to understand student motivations, attitude-behaviour models are sometimes used in educational research. The theory of planned behaviour (Ajzen, 1991) is sometimes adapted for the purpose of understanding such behaviours. In this paper, the theory is briefly described, followed by a review of literature which suggests evidence for the validity and reliability of the model in predicting behaviour. It is proposed that the factors that may affect student motivations towards learning science may be mapped using a questionnaire. It is suggested that this questionnaire will help teachers to create student profiles and augment their class lesson implementation accordingly. This may also enhance the presentation of the subject for both teacher and student.

Theory of Planned Behaviour.

The theory of planned behaviour (TPB) (see Figure 1) includes factors that relate to attitudes and the ability to predict behaviours in the presence of certain attitudes. In general, the greater the intention to engage in a behaviour, the more likely it is to be performed (Ajzen, 1991). In simple terms, TPB suggests that an individual will probably engage in a

behaviour if they intend to engage in that behaviour. This intention to engage is influenced by variable beliefs (positive and negative) about the behaviour described as attitudes, the perception of social pressure to perform the behaviour (subjective norms) and perceived ability to perform the behaviour (perceived behavioural control).

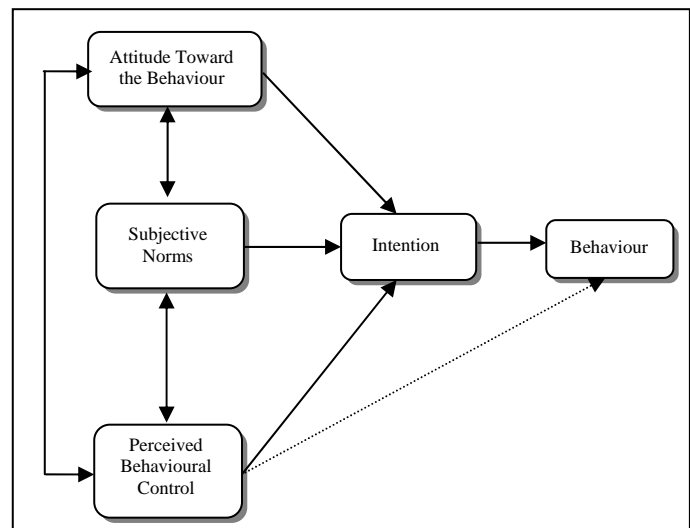


Figure 1: The Theory of Planned Behaviour.
(Ajzen, 1991)

Situational Interest.

In understanding student motivations toward learning, Pintrich (2003) distinguished between what students want and what motivates students in the classroom, suggesting that an important factor is whether students care about or think the task is important in some way. More recently, Krapp and Prenzel, (2010) and Prendergast (2011) focused on the concept of interest and asked how can

interest in science be generated and maintained? They suggest that interest can be considered as an ‘affective variable’ and an interest that is primarily caused by external factors can be called a ‘situational interest’.

The existing body of research typically modifies the factors within the TPB and uses it as a theoretical framework. There is considerable support for using and adapting the model to describe behaviour, particularly in education (Yu and Yu, 2010).

The TPB and Education.

Students are interested in all sorts of activities external to the school environment. Their daily environment offers many cognitively stimulating activities in many contexts that may lead to a ‘situational interest’. The TPB may be of some value in this respect when used in the educational context. Given that students’ historical learning experiences can affect engagement and motivation with a subject (Ainley and Ainley, 2011), a short questionnaire based upon the elements of the model may provide an insight into how best to isolate some of the factors affecting student motivation. The benefits of this are two-fold:

1. It helps teachers to create class motivation profile and design a suitable lesson plan.
2. Given an increased understanding of student motivation, a tailored approach to lessons may potentially improve the student experience leading to better grades.

Adapting the model to practice.

If student motivation towards science lessons is positive, then it is at least conceivable that their attitude and subsequent intentions towards the subject will also be positive. Using the TPB model

as a framework, the intention to engage in science is affected by ‘attitudes towards doing science’ which is impacted by the perception of one’s peers towards engaging in science (subjective norms) and the student’s perceived ability to do science (perceived behavioural control).

Accordingly, motivation could be thought of as a combination of these three factors. A proposed questionnaire which models these factors is proposed next using a 5-point Likert scale on each item in the questionnaire.

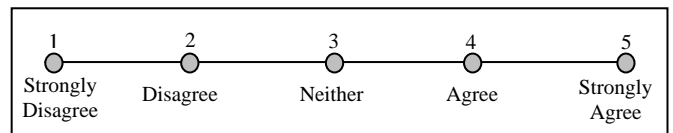


Figure 2: 5-point Likert scale proposed for the questionnaire.

The Proposed Questionnaire.

What follows are the proposed questionnaire items, separated out into the areas of the TPB model above, to describe students’ intentions and motivations towards science lessons.

Attitude toward doing science.

If the student’s attitude towards learning science is good/positive then it is likely that they will feel good about going to science lessons and subsequently enjoy those lessons. Accordingly, two questions pertaining to the attitude category would be:

1. I feel good about going to science lessons.
2. I enjoy science lessons.

Perceptions of one’s peers (subjective norm).

Peer pressure is a significant factor when trying to understand behaviour. If the student’s friends/peers think that science is

worthwhile and most of their friends/peers are enrolled in a science subject, then it is also likely that the student's perceptions of science will be mediated through this group's opinion. Accordingly, two questions pertaining to the perceptions of peer group category would be:

3. My friends think that science is a worthwhile class.
4. Most of my friends are enrolled in a science class.

Perceived ability to do science.

If the student's perceived ability to perform well in science is good/positive then it is likely that they will feel enabled to participate effectively in science lessons and that they can complete their homework assignments. Two questions pertaining to the perceived ability to do science category would be:

5. I am mostly able to do my science homework.
6. I am able to participate in science lessons.

Intention.

If the student's intention is to continue to take science classes both now and in the next year, then it is suggested that the combined effect of all the categories, including this one, will contribute to understanding student motivation towards science. Two questions pertaining to the intention category would be:

7. I plan to continue taking science classes.
8. I will be taking a science class again next year.

How can I use this in the classroom?

The combined questionnaire is available at <http://scienceireland.ie/teachers/teachers-notes/> where it can be downloaded and used by the teacher to assess student motivation and intention at any point in the school year.

Summary

Achsbacher, Li and Roth (2010) and Veder-Weiss and Fodus (2011) noted that science education can be enhanced to provide a solid foundation for lifelong learning. However, this is dependent upon the motivation to learn science. Motivation is not a simple concept to define nor is the proposed questionnaire the only design by which it may be measured. This paper suggests that the factors describing motivation such as attitude, subjective norms and perceived behavioural control may be a step towards understanding student attitudes towards science and science lessons. An incremental improvement in the understanding about student motivation to learn is valuable and may develop into significant gains for both teacher and student over time.

References

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