Measuring Study Habits in Higher Education: The Way Forward?

Measuring Study Habits in Higher Education: The Way Forward?

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Abstract. This article reviews existing study habit measurement instruments and discusses their drawbacks, in the light of new evidence from neuroscience on the workings of the brain. It is suggested that in addition to traditional frequency based past behavioural measures, the predictive accuracy of study habit measurement instruments could be improved by including measures of habit strength that take into account behaviour automaticity and efficacy, such as the Self-Report Habit Index (SRHI) developed by [1]. The SRHI has shown high reliability and internal validity in a wide range of contexts and its applicability and validity in the context of learning and higher education as an enhancement to study habit measurement instruments is as yet to be tested.

1. Introduction

The growth of the knowledge based economy has highlighted the need for developing a country's human capital and increasing the support for lifelong learning in the workplace [2] and several government and EU lead initiatives supporting lifelong learning have been launched [3]. A number of factors have been identified as facilitators of lifelong learning, such as learner's motivation, skills and ability to assess their own educational needs [4,5], while academic specific anxiety and low self-esteem were found to be an important negative predictor of performance and engagement in learning [6,7]. Recent meta analysis has also highlighted that in addition to motivation and anxiety, study habits are the third most significant predictor of academic performance [8].

A number of instruments have been designed to measure the effectiveness of students' study habits and strategies [8-10] and have been adapted and applied to provide educators with insight into the way students approach their studies and the impact that has on student learning and academic achievement [10]. However, advances in neuroscience are beginning to reshape the ideas held about the ways in which information is perceived, processed and managed by the brain. Theories suggesting that information is processed using two separate pathways are confirmed using brain scanning [11]. Brain scanning suggests that incoming information is "matched" to existing knowledge and if similarity between new and existing knowledge is found, the information is processed by the reflexive system (X-system). The reflexive system uses past experiences and information to make decisions and is automated, parallel and very fast. This system is very efficient and it is believed to be the default processing system used by the brain for decision-making and information processing. When the brain encounters a significant dissimilarity between the incoming and existing knowledge, it wakes up its reflective system (C-system) to processes the information and make a decision. The reflective system uses propositional logic to draw conclusions and in comparison the reflexive system it is effortful, slow and sequential [11].

Researchers have started to take into account the implications suggested from the two part model and new theories and implicit behavioural measures are emerging in social science and organisational behaviour [12,13]. The use of the model in education and learning has been very limited, but the two-part model has been used to explain teacher bias towards students' ethnic background [14], and to model the way in which experienced teachers transfer knowledge and experience to students [15], although the implications of the two-part model in the actual learning process has not been discussed. Study habits are one aspect of the learning process that utilises the two-part decision making process as habituated behaviour is by default processed by the automated reflexive system. Thus inventories measuring the strength of students' study habits ought to recognise and reflect the dual nature of the student study habit behaviour. The purpose of this positioning article is two fold. Firstly it reviews existing study habit instruments and examines the components of study habits and the scales used to measure them. Secondly, the article discusses the implications of the two-process model decision making and information processing model [11]. The article starts with a brief introduction to the field of learning and definitions of key terms. This is followed by an overview of most commonly used study habit measurement instruments, identifying their main components and scales. The implications of the two-part decision making and information processing theoretical model on study habit measurement inventories are discussed next and finally recommendations for study habit inventory improvement and future work are made.

2. Learning Styles, Preferences and Habituation

Many factors determine the way in which different people learn, and a large number of models have been developed to describe peoples learning preferences, styles and habits [8,16]. There is no agreed taxonomy for classifying learning styles and preferences and a number of researchers have attempted to identify appropriate dimensions for learning style classification (see [16] for an overview). The difficulty is in part due to the lack of a consistent naming convention for terms associated with learning and the learning process and the overlap in their functionality and dimentions. Five terms relating to learning are often used interchangeably by researchers: namely, learning preference, learning strategy, learning style, cognitive strategy and cognitive style. Their definitions according to [17] are given below:

- Learning preferences: these relate to the learner's preference for one method of teaching over another [17] and reflect the way in which a learner prefers to receive information. There are four ways for conveying and absorbing information and learning: Visual (via pictures and diagrams), Auditory (by hearing), Read/write (by text) and Kinaesthetic (by doing). The preferences of students for using combinations of information input pathways are measured using VARK type questionnaires [16,18].
- Learning strategy is defined by [17] as: "adopting a plan of action in the acquisition of knowledge, skills or attitudes". Study strategies relate to the students ability to manage resources such as available time, regularly reviewing lecture notes, under-lining passages in textbooks, preparing several drafts of essays, and the use of other students for peer support [7,19]. In addition, some instruments measure the propensity of students for deep, surface or strategic learning which are associated with different learning approaches such as use of evidence to link ideas or simply rote learning [20].
- Cognitive strategies form a subset of learning strategies and are concerned with the process of organising and processing information. They lead directly to learning results in terms of knowledge, understanding, and skill. Examples of cognitive strategies are: looking for relations among parts of the subject matter (relating), distinguishing main and minor points (selecting), thinking of examples (concretizing) and looking for applications (applying) [21].
- Cognitive style is defined as: "a systematic and habitual mode of organising and processing information" [17,22]. Several cognitive style indices and measures have been developed (see [16] for details of some of the most influential models).

- Learning style is the most all encompassing of the five terms and refers to "adopting a habitual and distinct mode of acquiring knowledge" [17,23]. A systematic review of learning styles was carried out by [16] and identified five different families of learning style depending on their degree of flexibility and propensity to change and evolve over time.

The definitions above show that habituation is an essential component of two of the terms associated with learning: learning styles and cognitive styles. Surprisingly, study habits are not explicitly mentioned in the definition above although, as mentioned previously, it is one of the predictors of academic performance [8]. A number of instruments for measuring the strength of students study habits have been developed over the past 60 years and the following section gives a flavour of their evolution over time.

3. Overview of Study Habits Inventories

One of the first study habits inventories was developed by [24] and it assessed study habits and attitudes which high and low scholarship groups possess to different degrees even though they have similar scores on aptitude tests. The inventory evaluates the effectiveness of the students' reading and note taking techniques, concentration, the amount of continuous time spend studying, both by oneself and as part of a group, the extent to which a students suffers from exam stress and the degree to which they plan their answers. The inventory consists of 28 questions measuring the frequency with which student engaged with a particular behaviour on a 3-point Likert scale ("rarely or never", "sometimes", "often or always").

The Survey of Study Habits and Attitudes (SSHA) was developed by [10] and consists of 75 items. These items assess learners'

study methods such as neatness of study space, effective use of study time, delay avoidance and planning of learning, as well as attitudes towards teachers, teacher approval and beliefs about teacher bias towards the student. In addition, the SSHA evaluated the students' motivation for studying, goal orientation and related attitudes towards importance of scholastic success. Although used extensively in research and for policy setting [25,26] it was not possible to verify the measurement scale of the SSHA instrument.

SSHA was adapted to British students by [9] as the Students Attitudes Inventory (SAI) which is an instrument with 47 true/false items considering four scales: student motivation, study methods, examination techniques and lack of distractions.

Another Learning and Study Strategy Inventory (LASSI) was developed by [27]. It is a 10 scale, 80-item inventory measuring the extent to which students adopt strategic learning as a function of their "study skills", "will" and "self-regulation". "Study skills" consist of approaches to information processing, summarising main ideas and test strategies, the scale for "will" assesses the extent of students' anxiety, attitudes and motivation, while the "self-regulation" component tests student concentration, time management and self-testing skills and use of study aids. Students self report the degree to which they consider a statement typical of them on a 5 point scale rated: a = "most atypical", and e = "very much typical".

One of the most recent developments is a 10 item, 3 scale, study habits questionnaire by [28] measuring three scales: access to good quality notes, scheduling and time management, and ability to concentrate. Students are asked to report the frequency of a particular behaviour on a 5 point Likert scale ("never", "almost never", "sometimes", "fairly often", "very often").

4. Discussion

The overview of study habit inventories outlined above show that all of the study habits inventory measures were designed to measure the effectiveness of the students' learning strategies, rather than their learning or cognitive style habits. As study strategies involve active planning and management of available resources it is difficult to tally this conscious effort on the part of the students with the expected automaticity and unconscious effort demanded by habitual behaviour. This contradiction could be explained by looking at the interactions between the reflective and reflexive information

processing systems [11]. Past behaviour consists of some routine or habitual behaviour processed by the automated reflexive X-system and some intentional, norm or situation governed behaviour managed by the logic driven reflective C-system and those two systems constantly interact [11,29]. Students who consistently use the same study skills and strategies benefit in the long run by gradually strengthening their decision pathways and shifting from using their reflective to using their more efficient and less effortful reflexive system [11]. In addition, the repeated actions lead to situational familiarity which is in turn more likely to trigger the same habitual behavioural response [29], further reinforcing the habituation of that particular behaviour. This reinforcing feedback loop may explain how students could be trapped in using inefficient study habits and strategies, even when they make a conscious effort to study hard or work efficiently [19,20]. This suggests that assessing the strength of habituation of a students study habits may improve the predictive power of the study habit construct. More accurate understanding of the strength of students study habits would enable educators to offer adequate means of support for individual students. For example, a student with weak bad study habits may find it easier to change it compared to a student with a stronger habit. Similarly, a student with weak good study habits may be at a higher risk of losing focus than a student with strong habits during periods of transition such as for example, when transferring from studying from school to university.

The main measure used to determine the strength a student's study habits is self reported past behavioural frequency, with the students who engage with the behaviour more frequently having stronger habits [10,28]. Although frequency of past behaviour is a very good indicator of future behaviour [30], the measure of past frequency introduces bias and error, as by definition, habitual behaviour is automatic and so it may be difficult recall accurately the frequency of occurrence of the behaviour in the past [31]. One approach for improving the measurement accuracy of habituated behaviour is to take into account the degree of automaticity and lack of consciousness present within that behaviour. It has been shown that the strength of habitual behaviour measured using an instrument taking into account both process past frequency of occurrence and automaticity had an additional discriminant validity over a measure of past frequency occurrence on its own, and this applied in the case of both overt habits (unhealthy food consumption) and mental habits (thinking negative thoughts) [30]. Similar results emerged when [30] carried out controlled experiments on information processing. These findings suggest that measuring the degree of habituation present in a particular behavioural process, in addition to the past behavioural frequency, could improve the predictive power of a construct. In light of this, the question arises on what is the best approach for measuring the strength of students study habits and whether the study habit constructs could benefit from the introduction of an instrument for measuring habituation as well as past behavioural frequency.

Theoretical development and empirical studies from other disciplines hint at an affirmative answer. As our understanding of the way in which the brain processes new information grows, it is becoming apparent that the complex relationship and interactions between the reflective and the reflexive information processing systems offer a challenging and exciting avenues for research. The impact of the automated reflexive system is of particular interest in studies in areas involving the formation of habits, such as for example study and learning habits. Appropriate instruments to measure the strength of study habits are emerging and, for example, [1] propose a very flexible instrument for measuring the degree of habituation of a particular behaviour, the Self-Report Habit Index (SRHI). The SRHI is a 12-item self report instrument of habit strength that measures five aspects of habits: history of repetition of behaviour, the difficulty of controlling that behaviour, the lack of awareness of the behaviour, efficiency, and how closely the behaviour is associated with the self. The construct has the advantage of being applicable to any type of behaviour as subjects are asked to agree or disagree with the extent to which a particular behaviour is performed automatically, i.e. without thinking or belongs to their (daily, weekly or monthly) routine. The construct also tries to ascertain the degree to which behaviour is associated with the self. It is worth noting that one of the study habit measures used a scale that reflected the degree to which a behaviour was typical of the student [27], indicating a possible convergence in past frequency behaviour measures and habit strength measurement in the context of study habits. Therefore, including a measure of habit strength in existing study habit

instruments may offer a way forward for improving the accuracy of study habit measurement instruments. The SRHI instrument has been tested and shown high validity and reliability in a wide range of everyday contexts such as reading newspapers, watching TV, eating junk food, thinking negative thoughts [1,30,32]. However, further empirical studies and work is required to test the practical suitability, reliability and validity of SRHI as an enhancement to study habit measurement instruments, in the context of higher education.

5. Conclusions

This article carried out an overview of existing study habit measurement instruments and discussed the implications of new evidence from neuroscience suggesting that information is processed by the brain using two distinct pathways: the fast, automatic reflexive pathway and the slower, reflective pathway. As strong habituation of inefficient study strategies or poor study skills may have a significant impact on student performance, accurate assessment the strength of a student's study habits could enable educators to put in place adequate academic support mechanisms. The study found that the majority of study habit instruments use the past frequency behaviour of students to assess the strength of their study habits and it is suggested that the study habit constructs could be improved by adding measures for process automaticity and habituation as suggested by [1]. The Self-Report Habit Index (SRHI) construct was identified as a potential candidate for improving the measurement power of study habit constructs, as it has been shown to provide valid and reliable measurement oh habit strength in many different contexts. Despite these promising results further work is required to test the practical suitability, reliability and validity of SRHI as an enhancement to study habit measurement instruments in the context of learning and higher education.

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