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Motivation, confidence and control; unravelling active learning for nutrition and food undergraduates

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ABSTRACT

Nutrition and food students at Sheffield Hallam University completed an 'active learning' assessment as part of a final year module, Applied Nutrition 2. The purpose of the 'active learning' assessment was to encourage and enhance learner autonomy. The assessment consisted of 5 main stages: a briefing; thought shower; oral business proposal presentation, and Nutrition Fair. To assess learner autonomy, levels of motivation, confidence and control were quantitatively and qualitatively monitored throughout the learning journey.

The results showed that levels of confidence, motivation and control increased following each stage and significantly across the learning journey. However, there were significant gender differences in terms of achievement of marks and in levels of motivation at various stages. On average females achieved higher marks in certain assessments and they demonstrated higher levels of motivation after the initial briefing. Further significant differences were also reported between different degree routes in terms of achievement of marks and levels of confidence, motivation and control.

'Active learning' has been shown to foster improved levels of confidence, motivation and control in a cohort of nutrition and food students, contributing to overall learner autonomy. Graduates able to demonstrate such qualities will undoubtedly be welcomed by employers in the relevant sectors.

KEYWORDS

Active learning, higher education, motivation, control, confidence

INTRODUCTION

There is very little published literature assessing the importance of 'active learning' assessment in the context of learner autonomy. Despite this, it has been identified that experience based learning (EBL) is associated with increased learner self-concept (Andresen, Boud and Cohen 1995), i.e. where learners accept responsibility for their own learning, this breeds both a positive attitude towards learning and the ability to adequately reflect on learning experiences in order to bring it under conscious control (Little 1995). Further, Dickinson (1995) states that where individuals are actively and independently involved in their own learning they are more motivated to learn and demonstrate greater learning effectiveness. Fazey and Fazey (2001) note the importance of incorporating opportunities for students to practice skills such as self appraisal, reflection, time management and workload management into students' study experiences. This is especially important as it has been identified that employers expect graduates to demonstrate autonomy-related characteristics such as these (Nield 2006).

Active learning?

There is no clear, universally accepted definition of active learning. Prince (2004) describes the process as 'any instructional method that engages students in the learning process' (pg 223). Unlike the traditional method of learning, where students passively receive information from an instructor in the form of a lecture, active learning necessitates the involvement of students in 'doing things' and requires them to think about what they are doing (Bonwell and Eison 1991). Bonwell and Eison (1991) have described how all learning, no matter how it is approached is inherently active; for example students are 'actively involved' when listening to an instructor or lecturer. Contrasting views are presented within the literature regarding the apparent inherent 'activity' involved in learning per se. Hamer (2000) exemplifies how students learning by listening to a presentation are in fact exhibiting 'passive learning'. This method of passive learning suggests that students learn by being told what they need to know. It is more probable however, that their learning exists on a sliding scale from relative passivity to active involvement. Certain learning scenarios will appear most naturally on the more passive end of the scale as others might do the opposite. Similarly, different learning styles will lend students to be more or less involved in a given learning opportunity thus making its passivity or activity learner dependent. Nonetheless, there are many supposed benefits of passive learning, e.g. large amounts of information can be relayed to students; instructors can exercise greater control over the classroom; large classes can be taught. Conversely, passive learning is less likely to encourage active processing of information by learners (Hamer 2000).

Students must do more than just listen and take notes in order to become active learners. They must carry out simple tasks such as reading, writing and discussing, as well as 'high order thinking tasks' such as analysis, synthesis and evaluation of challenges presented to them. According to Hamer (2000), traditionally there are two different classifications of active learning; non

experiential and experiential. The first presents learners with opportunities to contemplate or reflect on learning that has taken place in a more traditional setting (e.g. a lecture). This is likely to occur during the lecture itself. The latter is usually more complex and can be further distinguished into two groups; semi structured classroom activities and loosely structured experiential activities. Semi-structured classroom activities allow learners to explore topics that are relatively new to them through semi-structured tasks and discussion. The course this type of learning takes, typically that of group work, interaction and discussion, will in itself ensure an active component to the learning experience. Loosely structured experiential activities require learners to take on more intricate projects with a broader scope and typically a much longer completion time. Such activities might include role-plays, group projects and more intense debates (Hamer 2000). The complexity of activities generally increases as they become less structured/guided and more obscure. Hamer (2000) investigated the effects of incorporating semi-structured classroom activities into lectures in order to investigate the effect of active learning on performance in a final exam. Hamer's (2000) findings demonstrated that students who were taught using such experiential methods performed better in the exam than those who were taught in a traditional lecture format. Interestingly, the active learning approach not only improved scores on the higher level thinking questions, typical of this approach to learning (non-definitional questions), but also on lower level recall orientated questions (definitional questions).

Learner autonomy

As with active learning, notions of learner autonomy rarely reach a consensus but in general, and in agreement with a statement made by Cotterall (1995), autonomous learning may be defined as 'the extent to which learners demonstrate the ability to use a set of tactics to take control of their learning' (pg 195). Autonomous learners tend to exhibit a range of inherent behaviours and characteristics. Typically, these might include the ability to diagnose problems or barriers, time plan appropriately and establish why particular activities are being undertaken (Ho and Crookall 1995). Autonomous learners are less likely to be solely dependent on tutor support and/or feedback, and are more likely to consciously monitor their performance and to take control of their learning (Dickinson 1995). According to Cotterall (1995) autonomous learners use 'tactics' such as goal setting and progress monitoring/evaluation, amongst others, to ensure they maintain in control of their own learning.

We have identified three factors that contribute significantly to learner autonomy; these are motivation, control and confidence.

Motivation

The absence of motivation inhibits learner autonomy (Spratt, Humphreys and Chan 2002). Motivation or 'the desire to act', together with control and competence, is indicative of likelihood to perform. There are two kinds of motivation; intrinsic and

extrinsic. Intrinsic motivation suggests that the desire to act is controlled by internal and personal factors, whereas extrinsic motivation is driven by external factors such as rewards or external recognition (Fazey and Fazey 2001).

Autonomous learners are more likely to: be intrinsically motivated, perceive themselves as in control of their decision making, take responsibility for their actions, and exhibit more confidence in themselves. It has been observed that active learning cyclically enhances student motivation, encourages learning at a higher cognitive level, and also increases retention of information and concepts (Cherney 2008). However, this 'chicken and egg' nature has naturally led to an ongoing debate as to which comes first: motivation or autonomy? Spratt, Humphreys and Chan (2002) ask 'does autonomy precede motivation, does motivation precede autonomy, or does the relationship work in both directions?' (pg 245). Many authors suggest that it is autonomy that leads to motivation (Deci and Ryan 1985; Dickinson 1995; Dornyei and Csizer 1998). 'Learners' active and independent involvement in their own learning (autonomy) increases motivation to learn and consequently increases learning effectiveness' (Dickinson 1995, pg 165). However, more recently it has been proposed that this is not the case and that motivation is a key factor in establishing whether or not learners are ready for autonomy (Spratt and others 2002).

Control

Dickinson (1995) believes that learners who have control over learning success and failure are more likely to take responsibility for their learning and consequently individuals are more likely to be successful if they take responsibility and have control over their own learning. Learners may be particularly motivated where their levels of internal control are high, that is they believe that success or failure is down to their own actions, and that failure is a result of not trying hard enough. Those who are successful have enhanced self perception of competence, again increasing motivation. Learners with a high level of external control may suffer from a lack of motivation, believing that success or failure is due to factors outside of their control. It is therefore important to help students recognize factors that are within their control, in order to enhance motivation and competency. Active learning as a tool can significantly improve students' beliefs in their own abilities ensuring they become more efficacious in their learning (Dickinson 1995).

Confidence

Little (1995) identified 2 characteristics of autonomy (ability and willingness) and further divided these characteristics into different components. The ability to do something is dependent on the knowledge and skills that a person possesses and the willingness to carry out a task depends on the motivation and confidence that a person has. A person who is academically unconfident is unlikely to easily become an autonomous learner, and learner confidence correlates well with academic success (Coterall 1995). Where students possess both knowledge and skills they are likely to feel more confident, which itself increases motivation, and

thus their ability to utilize their knowledge and skills. The synergistic effects of these phenomena should not be underestimated and there is a real necessity to nurture learners' feelings of confidence from the outset of any given activity (Russell Wilke 2003).

Summary

The authors seek to investigate whether active learning enables learner autonomy over the course of a learning journey. We aim to understand how three key learner characteristics (motivation, confidence and control) assist learners in becoming truly autonomous and furthermore, to characterise the inter-relationship between motivation, confidence and control. To this end we will compare levels of motivation, confidence and control from the beginning to the end of the learning journey in a group of final year nutrition undergraduates undertaking an 'active learning' assessment.

RESEARCH METHOD

Background to the Module

Throughout their final year, nutrition and food students studying the module Applied Nutrition 2 prepare to host a stall at the annual Nutrition Fair. This 'active learning' assessment uses a five-staged learning journey model (see Figure 1) and involves students in planning and preparing for, then hosting a stall on a self-determined topic relevant to food, health or nutrition. The Nutrition Fair is designed as a piece of student assessment (students are graded based on their ability to interpret the evidence base and professionally translate core nutritional messages to a general audience in both paper format and orally).

Insert figure 1 here

The five-staged Nutrition Fair model uses semi-structured classroom activities and loosely structured experiential activities. The semi-structured classroom activities include a project briefing and a thought shower. From here, the assessment becomes less structured and classroom-based and moves to a 'loosely structured experiential activity'.

Learners are encouraged to become more independent and autonomous. Support from, and reliance upon tutors is reduced, a practice typically believed to encourage autonomy (Cotterall 1995). Tutors take a backseat role, intervening only where difficulties arise, otherwise students are largely left to get on with the planning and preparation stages. Where necessary, expert guidance is offered from technical or multimedia staff, however the ultimate product (the Nutrition Fair stall) is a construct of each student's learning journey. Where students themselves are the authors of their own learning, other benefits of active learning may become apparent including the ability to pay more attention to learning in general; focus

attentions on the key ideas that are being examined; retain and process information more effectively and improve episodic memory (Svinicki 1998).

Method of Investigation

The method used to evaluate and measure how motivation, confidence and control changed over the course of the active learning intervention was mixed (Saunders, Lewis and Thornhill 2009). That is, it combines both qualitative and quantitative measures.

Questionnaires

Prior to the assessment briefing (stage 1, see figure 1), students completed a demographics questionnaire in which they were asked to provide information relating to their age, gender, degree, mode of study (full-time or sandwich), work experience, previous visits to the Nutrition Fair and other relevant information.

At this stage, students also completed the first of many visual analogue scale-based questionnaires (VAS). The VAS asked three basic questions (see Box 1) to assess students' levels of motivation, confidence and control before and after each of the 5 module stages (see Figure 1). Students were asked to mark their responses on a 100mm bipolar line anchored with 'not at all' and 'highly/totally'.

Insert box 1 here

On the same questionnaire students were then asked to select a descriptor from a list as to why they might be feeling this way (these descriptors are listed in Box 2). The final descriptor in each case ('Or your choice...') offered students the opportunity to provide their own explanation of their feelings.

Insert box 2 here

The VAS-based questionnaires were completed by students before and after the assessment briefing (stage 1), before and after the thought shower (stage 2), before and after the oral business proposal presentation (stage 3), after receiving feedback (stage 4) and before and after the Nutrition Fair (stage 5; see Figure 1). In this way the complete learning journey was represented. Participant characteristics for the questionnaire phase are summarised in Table 1.

Insert table 1 here

Focus Groups

Two focus groups were held. One was student-orientated in which students were asked to reflect upon their journey and indicate how their emotions has changed in response to particular tasks. Participant characteristics for the student focus group are summarised in Table 2.

Insert table 2 here

The second focus group was staff-orientated, recruiting members of staff who were involved in the Fair preparation. The staff focus group explored the logistics associated with delivering 'active learning assessment' though it mainly focussed on whether staff believe the Nutrition Fair to be a useful activity that promotes learner autonomy. Participant characteristics for the staff focus group are summarised in Table 3. Both focus groups took place after the 2009 Nutrition Fair (i.e. once the students' learning journeys were complete).

Insert table 3 here

The questions used in the focus group were open-ended (see Box 3) as this allowed other questions to be asked for purposes of further understanding (Saunders and others 2009). The focus groups were recorded to allow adequate time for reflection and took approximately two hours. In the focus group the students were asked to explain how they felt at certain stages of their learning journey and to state the skills that they believed that they had developed. This allowed the data collected to run alongside the questionnaire data for purposes of triangulation.

Insert box 3 here

Throughout the course of this research three sets of processes have been utilized to analyze the focus group data. These are categorization of data, unitizing data and recognizing relationships/categorizing data.

Categorization is the process of classifying data in to meaningful and usable categories (Saunders and others 2009). Strauss and Corbin (1998) suggest three main sources of names for the categories. These are terms that emerge from the data, terms used by participants and terms used in the literature or theory. These are used in the research, e.g. excited.

With regard to unitizing data; units are relevant "bits or chunks of data" (Saunders and others 2009: 381). They may be words, phrases or sentences. Unitization was achieved in the analysis by categorization and then by coding the responses under those groupings. Unitization came from the students' learning journey and by comparisons of feelings at the different stages of that learning journey.

Finally, generating categories and reorganizing data accordingly is the process of analysis (Yin, 2003). The process of identifying themes and developing categories is reflective (Miles and Huberman, 1994). It includes identifying patterns, processes, commonalties and differences. Throughout this research process key themes have been sought.

Mixed Methods

The rationale for this mixed methods approach was that the quantitative method, the first part of the questionnaire, would demonstrate if any statistical trends were apparent and the qualitative methods, the second part of the questionnaire and the focus groups, would give in-depth explanation of such trends (Stake 1995). Triangulation of the findings would produce a richer dataset and better achieve the aim of the study (Saunders and others 2009).

65 students enrolled on this level 6 module, Applied Nutrition 2, in our study year (2008-9). All participants gave full and informed consent to take part in the research, including audio recording in the focus groups. The research was approved by the relevant Research Ethics Committee at Sheffield Hallam University.

Questionnaire responses were collated and analysed using SPSS version 15.0 for Windows (2007, SPSS Incorporated, Chicago, Illinois). Data are presented as means with standard deviations. Graphical presentations were prepared using Microsoft Office Excel (2007, Microsoft Corporation, Redmond, Washington).

Research Process

Students were briefed on the assessment package in the first seminar before the practical series began. Students were given all of the assessment grids and a full written and oral briefing during this session. They were given the opportunity to ask questions and seek clarification at this point and throughout the process.

The Nutrition Fair planning and execution was then supported through the four practical classes hosted within the module as follows.

Practical 1 was a supported thought shower session. The ultimate aim of the thought shower is for students to select and hone a suitable topic for their Nutrition Fair stall. Prior to the thought shower, students were required to collate various materials (including advertisements, media articles, academic papers, leaflets, videos, commercials and so on). During the thought shower, students discussed their ideas and chose their own topic in negotiation with a tutor. The tutor's role was to act as mediator where a topic might be considered too broad, complicated or ethically unsuitable for a public event. By the end of practical 1 most students had a reasonably clear idea of what their chosen topic for their Nutrition Fair stall would be.

In preparation for practical 2 students were asked to work on their first piece of written assessment for the module. The written business proposal required critical evaluation of appropriate academic literature, consideration of the relevant contemporary context and a full risk assessment and ethics declaration. Students were advised on what constitutes appropriate literature and were guided towards

peer-reviewed sources. The written business proposal was designed to present the academic underpinning to the proposed stall.

In practical 2 students orally presented their business proposals. This presentation gave students the opportunity to detail the practical aspects of their stall. They reported on the branding, activities, general look and appeal of the stall, as well as identifying a target group for their stall. A formal panel consisting of academic and technical staff assessed the presentation and asked academic, practical and technical questions. These presentations were delivered in front of the students' peers. Students were informed of the formal nature of this presentation and staff and students alike wore business dress for the occasion. The room was set up accordingly and timings were strict.

Following practical 2's oral presentations and the accompanying submission of the written business proposals, students received written feedback in practical 3. In practical 3 students were then given the opportunity to try out recipes and to identify and book equipment for their stalls.

Practical 4 was the Nutrition Fair itself. Here the students were brought together in the large Students' Union building to open the Fair to the public. The Fair was open for 2 hours and in 2009 attracted 440 visitors. Students hosted their stalls throughout and were marked by academic staff as they interacted with the visitors.

FINDINGS AND CONCLUSION

Questionnaires

Figure 2 below illustrates how the students' motivation, control and confidence changed throughout their 5 stage journey.

Insert figure 2 here

Overall trends

Figure 2 shows mean (\pm SD) levels of motivation, control and confidence at the various stages of the learning journey outlined in Figure 1. It is interesting to note that throughout the journey motivation remained relatively high, though learners generally demonstrated greater levels of motivation following the completion of each stage. There were highly significant increases in mean reported levels of both control and confidence from before the brief (pre1) to after the Nutrition Fair (post5; $p < .0005$ and $p < .0005$, respectively). This may reflect how the students came to terms with the task and with this became more confident in their abilities. Additionally, the 'hands-off' nature of tutor support may have forced the students into taking control. From before the brief (pre1) to prior to the Nutrition Fair (pre5), reported means for all three factors of motivation, control and confidence significantly increased ($p < .0005$, $p = .007$ and $p = .002$, respectively).

Explaining levels of motivation, control and confidence (see Figure 2 and Box 2)

As previously explained, when using the VAS to rate their levels of motivation, control and confidence, students were also asked to explain why they had chosen each rating. Box 2 summarises the descriptors available. Where a reasonable proportion of students chose a particular descriptor (more than 10 students), details are summarised below (number of students for each descriptor provided in parentheses).

Before the initial briefing (pre1; n=64) levels of motivation were explained, in most cases, by students feeling anxious (24). In terms of control they mainly felt unprepared (22) and their confidence was challenged (17). After the briefing (post1; n=64) student levels of motivation were still largely explained by feelings of anxiety however only 14 students reported this. Others most commonly reported feeling excited (12), inspired (11) and interested (10). These sentiments may in part be due to dramatically improved levels of control, reportedly due to most feeling informed (24) and, in terms of their confidence after the briefing, feeling supported (16), challenged (14) and optimistic (14).

Before the thought shower (pre2; n=65) levels of motivation were once again primarily explained by heightened anxiety (19) though some students reported feeling interested (12). Levels of control at this point were explained by the dichotomous feelings of being unprepared (12) and overwhelmed (10) versus informed (11) and on target (10). This dichotomy is again reflected in the terms used to describe students' levels of confidence as feeling challenged (16) and optimistic (13) versus unprepared (14).

After the thought shower (post2; n=63) levels of motivation improved with students mostly reporting feeling inspired (17) or enthusiastic (14). In parallel, levels of control increased, reportedly due to feeling informed (22) and confidence also improved as students felt optimistic (14), challenged (13) and supported (10).

Naturally, before their oral business proposal presentation (pre3; n=65) levels of motivation dipped because many students felt anxious (34). Levels of confidence also fell. Despite most students feeling prepared (14), many felt overwhelmed (13) or pressurized (12). Their levels of confidence reached an all time low with most feeling apprehensive (15) or challenged (14).

After they had delivered their oral business proposal presentations (post3; n=65) levels of motivation improved, albeit only slightly. They mostly reported feeling enthusiastic (15) and inspired (14). Levels of control improved as most students felt prepared (15). Confidence rose again due mainly to feelings of optimism (18). Once they had received their feedback on both the oral and written business proposal tasks (post4; n=60), their levels of motivation were mostly explained by

anxiety (19), control by being unprepared (14) and confidence by optimism (15) and feeling challenged (13).

Before their final task, the Nutrition Fair itself (pre5; n=55), the students were mainly motivated by anxiety (28). Their levels of control were mainly explained by feeling prepared (15) though some still felt overwhelmed (10) and disorganised (10). This may be in part be explained by their varying levels of confidence with an equal number feeling optimistic (11) versus apprehensive (11).

After the Fair (post5; n=50) motivation dipped perhaps because their assessment tasks had come to an end for the module; most students reporting feeling inspired (16). Levels of control were at an all time high with most students feeling empowered (17). Confidence also peaked at this point and students reportedly feeling optimistic (14).

Gender Differences

In terms of achievement in the Nutrition Fair assessment tasks, on average females achieved significantly higher marks in the oral business proposal presentation (worth 20%; $p=.020$) and overall (100%; $p=.023$) but there were no significant between-gender differences in marks awarded for the written business proposal (worth 30%) or the Nutrition Fair itself (worth 50%).

Similarly, females were significantly more motivated than males following the initial briefing ($p=.002$) but at no other stage. There were no significant differences in mean levels of perceived control or confidence between genders at any stage.

Degree Route Studied

Students study this module from three different BSc routes: Food and Nutrition (F&N, elective module), Public Health Nutrition (PHN, core module) and Nutrition, Health and Lifestyles (NHL, core module). F&N students are most likely to have completed a placement year at level 5. PHN students achieved significantly higher marks than NHL students at the Nutrition Fair itself ($p=.023$). F&N students' marks at the Nutrition Fair did not differ significantly from those achieved by students on the other routes. There were no other significant differences in marks awarded for tasks between students studying different routes. When comparing levels of motivation, control and confidence between the routes at different stages, it was interesting to note that the PHN students, relative to the F&N students, were significantly less motivated before the thought shower ($p=.024$), significantly less in control and less confident after the thought shower ($p=.009$ and $p=.005$, respectively) and significantly less confident after receiving feedback from the proposal stages ($p=.013$) despite going on to achieve high marks at the fair itself. There were no other significant differences in motivation, control or confidence between routes.

Focus Groups

Feedback from the student focus group was varied but certain comments help further explain the students' learning journey (see Figure 2). The results of the focus groups may be summarized as follows.

1. The briefing

The overwhelming response of most students was that initially they were apprehensive or even slightly daunted by the new level of work that they were to engage with. After the briefing students reported that they felt 'excited', a comment that was supported by the high levels of motivation at this stage. The reason for the "excitement" was that the students were able to take part in an autonomous, self selected piece of work about which they felt passionate. As one respondent summarized 'it [the project] let them off the reins' and as a consequence you 'could do things that interest you and just go for it'.

2. The thought shower

The thought shower produced interesting responses as some of the respondents saw the generation of ideas as a 'competitive process' while others saw it as time to reflect on the ideas and make comparisons. Regardless of the language used both answers had a strong element of competition.

Once they had started their topic, after the thought shower, they felt a little 'confused' and reported this as 'quite scary'. Their responses here were similar to those of the initial briefing. An interesting development here was that although the students sought autonomy after the initial briefing they were unconvinced regarding their ability to be autonomous. This reflects the 'scared comments' in that the students were on their own but nevertheless required input from their tutor particularly regarding the literature where they were unsure as to whether it was fully covered or not. Requests were made here that the tutor should be close to hand when they were researching their topic area. In summary, the students had sought autonomy but this level of autonomy could be daunting and therefore the "safety blanket" of their tutor was thought necessary.

3. The oral presentation

After the thought shower the students had to 'pitch' their ideas via the oral business proposal presentation. This was time limited to eight minutes. The students suggested that the proposal pitch was 'formal' and they had 'never done it before' which could account for the very low levels of confidence reported before the proposal pitch. The experience was described as 'challenging' but students began to recognize the other skills that they were acquiring. Interestingly, gaining the confidence to be able to pitch was regarded very much as a skill that would be useful in industry or the real world. Importantly from the point of view of autonomy it made the students 'work on their own and develop their own skills'. Further, as one respondent phrased it, they 'had to be professional'. It was at this stage that the students developed an awareness of their developing skill sets.

4. The Fair

On the day of the Fair the students were 'frantic' and felt they were 'running on adrenaline'. It is interesting to note that these feelings coincided with relatively high levels of motivation. Again students began to notice that they were acquiring skills that would be useful to them in future. One student said that he had developed 'coping strategies' to deal with the pressure and he had been able 'to produce under pressure'. Interestingly, unlike the thought shower stage where students had felt uncertain of their knowledge, the students now felt that they acquired subject and practical knowledge. One respondent summed this up admirably when she said 'I do know what I'm talking about' and that she 'felt aggrieved if people (the fairgoers) just took [food or drink] samples.' In summary, at this stage the students had grown in self-confidence, an attribute that is thought by some to underpin other attributes related to graduate employability (Nield, 2006).

When looking at the total experience along the learning journey, the students felt that the experience had helped them to develop a number of key skills and competencies including how to 'work under pressure...and how to relate to the public', develop 'face to face confidence', to be 'more independent' as well as other 'transferable skills'.

In summary, at the end of the learning journey, the students were asked to say what were the main skills and competencies that they had acquired. Unsurprisingly, there was complete accord with being able to work under pressure. The time limited nature of the 'pitch' and the Fair that had been described as 'scary' was now seen as catalysts for change in behaviour. Related to this the students had become autonomous and were able, after earlier misgivings, to believe in their ability to work on their own. It is interesting to see that at the final stage of the learning journey (after the Nutrition Fair) levels of confidence and control were higher than at any other stage. Finally, as part of confidence building the students agreed that they could relate to and talk to the public with authority and consequently their interpersonal skills had improved.

Further to the student focus group, a parallel focus group was run with staff (n=7, both academic and technical) who had been involved in the module. The staff concurred with the feelings of the students. It was certainly agreed by the staff that this activity allowed students to experience what life in the workplace might be like, as many of the skills used for this assessment were transferable and would be used later in employment.

Staff praised students for using their initiative and time management skills to arrange the Nutrition Fair. When asked whether staff felt the Nutrition Fair helped students to develop as autonomous learners, it was stated that although it would surely contribute to autonomy, it would be wrong to assume that the students became autonomous purely as a result of the Fair. This finding agrees with that of

the students who required help at some stages but, nevertheless, had become more autonomous and confident as the module progressed.

Interpretation

As level of knowledge and skills improved through each stage of the learning journey, students gained confidence, which could explain the increases in motivation seen after the completion of each stage. Each stage involved activities that epitomize autonomous learning and unsurprisingly, many of the students displayed characteristics of autonomous learners described by Cotterall (1995). They were able to diagnose difficulties – whether this was choosing a topic, presenting their business proposals or facing the public at the Nutrition Fair itself. They effectively allocated and managed their time in order to complete the different stages of the project. Certain deadlines, such as handing in and orally presenting their business proposals, and the actual day of the Nutrition Fair were scheduled by staff and were there to maintain student progress throughout the journey. However students were also required to complete individual tasks such as designing and making their stall materials, writing the proposal and preparing the presentations in their own time as well as managing workloads from other level 6 modules. Throughout the journey the students had to set themselves goals in order to efficiently complete the challenges that had been either set for them or that they had set themselves. The Nutrition Fair offered learners the opportunity to develop and hone the skill of choosing materials and methods for themselves, an important feature of learner autonomy. Students had to choose how they wanted to set out their stalls, and what tasks and materials they would use to effectively engage the public. While certain constraints (printing, size of stall etc) were applied by tutors, the majority of the information provided on the stall, and the way in which it was presented, was down to the individual student.

It is generally agreed that learners become more autonomous the more motivated they are (Deci and Ryan 1985; Dickinson 1995; Dornyei and Csizer 1998). This has certainly been the case during the Nutrition Fair learning journey. As the students progressed through the planning process, and consequently became more independent, levels of motivation increased significantly, in accordance with the views of Cotterall (1995) who described how autonomy can be encouraged through the gradual withdrawal of teacher support.

It is well established that in British Universities, females achieve fewer first class and more upper second class degrees than their male counterparts (the 'gender gap') (Rudd 1984; Mellanby, Martin and O'Doherty 2000; Smith and Naylor 2000; Richardson and Woodley 2003). This appears not to be due to differences in the types of degrees studied or individual or institutional characteristics but to the way that these attributes impact performance (McNabb, Pal and Sloane 2002).

There are gender differences in personal factors such as anxiety, stress and motivation; however these do not have an effect on overall degree performance.

Indeed, women often score higher in motivation (as they did here following the initial briefing) and work effort than men (Mellanby, Martin and O'Doherty 2000) contradicting early theories of motivation depicting women as under-achievers (Meece, Glienke and Burg 2006). From a relatively young age, males appear to have higher self efficacy scores (which positively influence motivation and achievement) in maths, science and sport, compared to females who score higher in subjects such as literature and the arts (Meece, Glienke and Burg 2006). Motivation related beliefs appear to follow gender-role stereotypes; however the gender gap for maths and science subjects seems to decrease with an increase in age, whereas the gap seen within the literacy domain remains constant. Studies in the area of gender and motivation tend to be domain specific and focus predominantly on school aged children, making wider generalisations difficult.

PHN and NHL students are less likely to complete a placement year than F&N students. This may explain why PHN students were less motivated than F&N students before the thought shower. Because motivation is intrinsically linked to confidence and control, a placement year working in a relevant field is likely to have significantly improved levels of confidence (Neill and Mulholland 2003) and control and thus students' enhanced levels of motivation towards this real and relevant assessment. However, this finding for PHN compared to F&N students was not mirrored with the NHL students.

It has been shown that students with more work experience (i.e. those who undertake a work placement year) achieve higher marks (Gomez, Lush and Clements 2004) however this notion is not supported here. Students studying on the degree route where work placement was commonplace (F&N students) did not achieve significantly higher marks than those studying on degree routes that did not typically offer a placement year. It was interesting to note however, that PHN students, who do have the opportunity to do a placement (although fewer PHN than F&N students embrace this opportunity), did score significantly higher marks at the Nutrition Fair than the NHL students (where no placement year is available).

Limitations

There was no "passive" control group for comparison of results, so it is not possible to know if motivation, confidence and control would be different in this instance. However it has previously been stated that individuals who are actively involved in their own learning and participate in higher level, more complex tasks (as opposed to more passive, instructional tasks) appear to be more motivated to learn (Dickinson, 1995). Due to the unique assessment method used in this module, and in order for each student to achieve the learning outcomes, all students completed the same tasks, enhancing their employability by gaining autonomy-related characteristics.

It seems unlikely that the number of different numbers of VAS-based questionnaire respondents at each time point (from n=50 to n=65) had an effect on the

significance of the results. It may be that more motivated and confident students answered more frequently; however there is no way of identifying whether this is the case.

While students were not given exact definitions of motivation, confidence and control, they were provided with numerous related descriptors (Box 2) to qualitatively assess these feelings, as well as a visual analogue scale for quantitative assessment.

In the student focus group only 2 of the possible 3 courses were represented. However, general discussion amongst students regarding their experiences during the development and presentation of the Nutrition Fair appeared to be very similar regardless of field of study. Regarding the staff focus group, a representative number of staff from the various teams involved were present.

Concluding Remarks

Overall, the learning journey for this 'active learning' assessment leads to increased levels of motivation, control and confidence prior to the final assessment compared to baseline. Some students may find this journey as learners more rewarding than others. This may depend on gender or BSc route of study. It should also be noted, that although there are many benefits to active learning, the use of this method of teaching is often limited by large class size, lack of facilities and materials, and limited class time.

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The student learning journey

Figure 1

	N	Gender	N
Total Participants	65	M	12
		F	53
Students studying Food & Nutrition	14	M	5
		F	9
Students studying Public Health Nutrition	25	M	2
		F	23
Students studying Nutrition, Health and Lifestyles	26	M	5
		F	21

Participant characteristics for the questionnaire phase

Table 1

Case number	Course	Gender
1	Food and Nutrition	M
2	Food and Nutrition	M
3	Food and Nutrition	F
4	Food and Nutrition	F
5	Public Health Nutrition	F
6	Food and Nutrition	F

Participant characteristics for the student focus group.

Table 2

Staff Descriptor	Number involved in focus group
Academic staff: Not involved in teaching on the module, but present for the Nutrition Fair and involved in assessing the students	1
Food Technical Staff: Attended the students' presentations and helped with food preparation and presentation for the fair	5
Multimedia Staff: Offered ICT advice for students designing leaflets and other technology based aspects of assessment	1

Participant characteristics for the staff focus group.

Table 3

Questions used in the visual analogue scale-based questionnaire

How motivated do you feel at this moment about the forthcoming Nutrition Fair project?

What level of control do you feel you possess at this moment about the forthcoming Nutrition Fair project?

What level of confidence do you feel you possess at this moment about the forthcoming Nutrition Fair project?

Descriptors offered via the questionnaires to help students qualitatively explain their levels of motivation, control and confidence.

Motivation		
I feel...		
Anxious	Focused	Inspired
Fearful	Enthusiastic	Excited
Interested	Competitive	Disinterested
Creative	(Or your choice).....	
Control		
I feel...		
Empowered	Prepared	Overwhelmed
Unprepared	Lost	Equipped
Disorganized	Informed	Pressurized
I am on target	(Or your choice).....	
Confidence		
I feel...		
Well prepared	Supported	Challenged
Optimistic	Despondent	In control
Unprepared	I will succeed	Pessimistic
Apprehensive	(Or your choice).....	

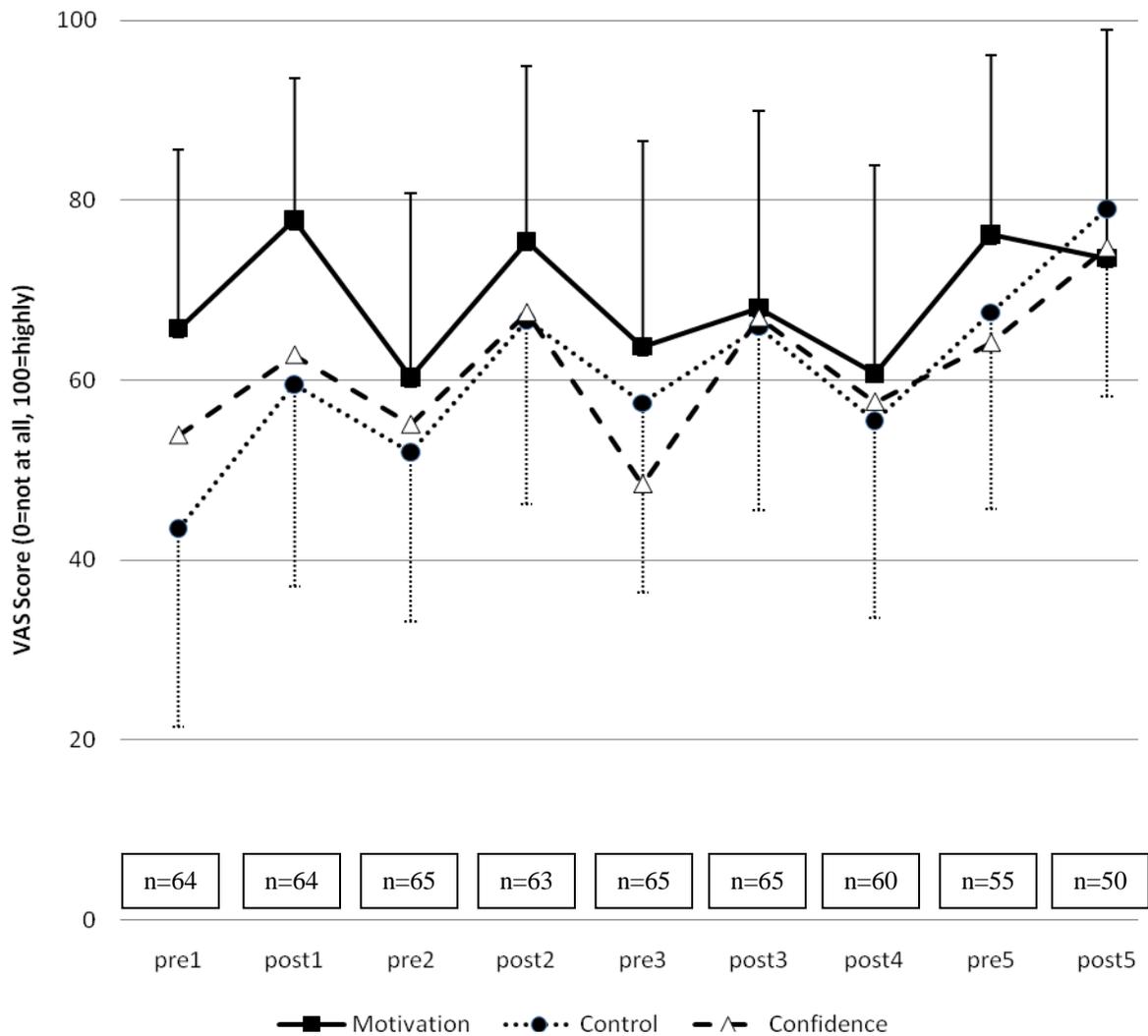
Questions asked in the focus group sessions.

Questions asked in the student focus group

1. Thinking back to the day you were given the brief for the Nutrition Fair, how did you feel about the task ahead?
2. What were your thoughts and feelings when you were advised it that you had to decide what nutrition-related topic to research and present to the public? Talk me through your thought processes and emotions.
3. How confident were you that you had met your brief?
4. After the initial brief you had to pitch your ideas to the tutors. How capable did you feel in meeting this challenge?
5. What benefit do you believe you got from working with a variety people with different skills during the planning and delivery of the Nutrition Fair (technicians, tutors, multimedia, sponsors etc.)?
6. What were you emotions during the day of the Nutrition Fair? Were you able to relax and enjoy it?
7. What are the main skills and competencies that you feel you have developed and how do you feel this experience, as a way of learning, compares with modules?
8. If you were to repeat this experience what would you do differently and are there any ways you feel the event could be changed to improve the learning experience?

Questions asked in staff focus group

1. How onerous were the oral business proposal pitches for the staff involved?
2. How difficult or easy is liaison between the different staff teams involved in the preparation phase of the Nutrition Fair? Were there opportunities for transferring skills and knowledge?
3. On the morning of the Nutrition Fair it's very busy, do you feel anything could be done to reduce the stress/ strain felt by staff or students?
4. Do you think students develop as autonomous learners from the taking part in the Nutrition Fair?
5. If this experience were to be repeated, what do you think could be done differently and are there any ways you feel the event could be changed to improve the learning experience for students and demands put on staff?
6. How onerous was the day for you as a member of staff?



Levels of motivation, control and confidence change throughout the learning journey. Levels of control and confidence increased significantly from before the briefing session (pre1) to after the Nutrition Fair (post5; $p < .0005$ and $p < .0005$, respectively). In addition, levels of motivation, control and confidence all increase significantly from before the briefing session (pre1) to before the Nutrition fair (pre5; $p < .0005$, $p = .007$ and $p = .002$, respectively).

Figure 2