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Author post-print (accepted) deposited by Coventry University's Repository

Original citation & hyperlink:

Payne, L 2017, 'Student engagement: three models for its investigation' *Journal of Further and Higher Education*.

<https://dx.doi.org/10.1080/0309877X.2017.1391186>

DOI [10.1080/0309877X.2017.1391186](https://dx.doi.org/10.1080/0309877X.2017.1391186)

ISSN 0309-877X

ESSN 1469-9486

Publisher: Taylor and Francis

This is an Accepted Manuscript of an article published by Taylor & Francis in Journal [Journal of Further and Higher Education](https://doi.org/10.1080/0309877X.2017.1391186) on 05/03/2018, available online: <http://www.tandfonline.com/10.1080/0309877X.2017.1391186>

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Student Engagement : Three Models for its Investigation

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¹ This work was supported by a PhD Scholarship from Scholarship from Coventry University.

Abstract

Student engagement is a complex phenomenon, with diverse interpretations, even within Further and Higher Education. This paper presents three potential, interconnected, novel models which provide a measure of unification of the range of interpretations and hence may improve understanding of the broad phenomenon. The models emerged from a study of computing students but should be relevant across a wide range of disciplines. They are presented as being provisional but they should be useful in providing modifiable frameworks for the investigation of engagement issues and in student support activity. The first model is in the form of a force-field diagram, identifying forces which drive for, and those which drive against, student engagement. The second identifies four possible levels of student engagement created by an individual's responses to those forces. The final model represents an individual student's engagement as comprising four dimensions, encompassing forms of motivation and connectedness. In addition to these models, this paper suggests that some students who may appear to be disengaged should more accurately be considered to be 'differently engaged'.

Keywords: student engagement, attendance, differently engaged, student support, engagement models.

1 Introduction

Student engagement is an issue which concerns many academics across Further and Higher Education, both in the UK and elsewhere, certainly across Anglophone countries (Hu and Kuh 2002; Kahn 2014; Wimpenny and Savin-Baden 2013; Zepke 2015), often coupled with student satisfaction or achievement. In situations where there is a concern to improve either of these attention often focuses on student engagement or, perhaps more particularly, disengagement (for example HEA 2012; Kahn 2014; NAO 2007; Trowler 2010; Yorke and Longden 2004). However student engagement is a term which is used in diverse ways. Sometimes it is used to refer to little more than student attendance or task completion (Bryson 2010; Trowler and Trowler 2010; Zepke 2015). However deeper, broader and more nuanced meanings, which consider engagement to be faceted or multi-dimensional, can also be taken. This paper describes work which started by considering student disengagement. This led to recognition that there are levels of engagement and that students engage in different ways, in response to the range of factors applying in their specific context. The three new, interconnected models of engagement which are described here originated in efforts to understand these diverse behaviours. Whilst the models emerged from work in the computing discipline, it seems probable that they have relevance and potential value as flexible frameworks for the examination of engagement issues across very many disciplines.

This paper commences with a short, and inevitably selective, summary of the vast range of literature on student engagement. Aspects of the project which led to this paper are then introduced. The body of this paper is descriptions of the three novel, tentative models of student engagement which highlight and integrate its multi-faceted character. Some issues which emerged are then discussed, including some potential unintended consequences of student support interventions. It will be suggested that consideration of individual students' characteristics and identities may be helpful for successful student support and engagement interventions, in any discipline.

2 Student Engagement Literature

What is student engagement?

Student engagement is a concept which has evolved as individuals, and the academic community, have developed their understanding. For individual academics this may start with a concern about the weak achievement of some students, and a desire to improve this, which is then seen as a need to encourage student attendance (for example, Buckley 2013). Attendance may then be seen to be less important to achievement than student attentiveness, with some researchers extending engagement to embrace students' involvement in classroom activities (for instance, Price, Handley and Millar 2011). Also, some authors recognise that non-human factors such as course timetabling (for example, Bryson 2010) and the course regulations and requirements (such as Raftery 2013) may also impact on engagement. In this way consideration of student engagement has expanded as more factors are recognised as being relevant or significant. Consequently the term has been used in diverse ways (Trowler 2010; Zepke 2015).

'The concept of student engagement... has evolved over time and has been applied to any of the following: time spent on task; quality of effort; student involvement; social and academic integration; good practices in education; and learning outcomes' (QAA 2012, 2).

Exploring wider influences, some authors have further deepened the understanding of engagement by noting that full engagement involves an emotional connection to the course, and risk. For example:

'Student engagement [is when] ... not only students' time and physical energy [is] directed toward learning opportunities, but also the emotional energy required to enter into the adaptive learning process. Engagement occurs when students accept a level of identity-based risk and are willing to experience potentially emotional outcomes associated with learning, both positive and negative' (Dean and Jolly 2012, 235).

Student engagement: its character

There is a vast body of work investigating engagement. Trowler and Trowler identified and reviewed a corpus of over 1000 robust papers where the focus was student engagement (Trowler 2010; Trowler and Trowler 2010). Trowler (2010) comments that much of this corpus takes an essentialist view of students, assuming a sameness and deterministic uniformity in students' responses which, as Zepke (2015) for instance points out, is self-evidently not the reality. As Bryson (2010) notes, student engagement is socially constructed and is therefore both individual and dynamic. Lawson and Lawson (2013) develop this and recognise that engagement needs to be considered within personal, dynamic student ecosystems and include consideration of home and community contexts, in addition to school and academic activities. The Trowler (2010) review also identified that the specifics of the local context may affect student engagement, as may discipline-specific factors.

Trowler (2010) notes that literature also often takes a normative position, uncritically assuming engagement is always entirely positive. Trowler's corpus widely agrees that good engagement enhances achievement but also that weaker and less well-prepared students have most academic benefit from being well engaged. However this is not a universal finding. For instance, Zepke (2015) suggests that this link between achievement and engagement may not always be present or may be weak, perhaps in particular groups of students (such as international, religious minority or first generation students) who can feel overwhelmed or isolated, despite being well engaged within some definitions of the term.

Student engagement: its antecedents

Some literature tries to separate student engagement from its antecedents and consequences (for instance, Kahu 2013). However, as Kahu herself recognises, engagement is both a process and an outcome. Many other authors (such as Lawson and Lawson 2013; Reeve 2012) also recognise that there are feedback loops within the engagement ecosystem. Nonetheless, whilst it is not possible to entirely separate engagement from its antecedents and consequences, it is useful to focus on them separately.

Much work in this area has been to try to identify antecedent factors which are important for the generation of student engagement, and many have been suggested. Wimpenny and Savin-Baden (2013) conducted a review and synthesis of the engagement literature, building on the Trowler (2010) review, focussing particularly on the findings from qualitative studies. They highlight the importance of student persistence and resilience to good engagement. Yorke and Longden (2004) found that

having a clear sense of purpose for their studies was important to students remaining committed, persisting and not withdrawing: staying engaged in that most fundamental of senses. Hu and Kuh (2002) similarly found a sense of purpose to be important for good engagement but, perhaps counter-intuitively, that if the institution emphasized the vocational relevance of a course, students tended to be less engaged with it. They suggest that this could be a result of some students attending as 'a means to an end' rather than through a genuine interest in the subject.

Bryson (2010) sees student engagement as being the result of the students' teaching and learning experiences but also, crucially, their integration. By integration he means Tinto's concept of social and academic integration – a student's sense that they belong: an emotional connection. Other studies (such as Dean and Jolly 2012; HEA 2012; Trowler 2010) add support to Bryson's view that an emotional connection is important for engagement. Bryson does not however allude to motivation, which Yorke and Longden (2004) found to be essential for engagement.

Some other researchers consider engagement to relate to self-efficacy, a concept developed by Bandura (for example, Bandura 2006) referring to one's confidence in one's ability to succeed – again identifying emotional influences. For instance, Haggis (2003), Pintrich (2004) and Purkey (2000) consider that it is self-efficacy which is important for student success. Pintrich also observed that it is a sense of value of the endeavour which gives the motivation to embark on a task, and is therefore a precursor to engagement.

Thus, across the literature, a number of issues are seen as being important factors in encouraging engagement including: a sense of purpose and interest; social and academic integration and emotional connectedness; self-efficacy and teaching and learning influences. Whilst providing some understanding of the behaviours being witnessed in the context of the current study, these factors failed to explain some participants' responses. The models presented here developed from seeking a fuller understanding.

Models and typologies

Many authors have developed models or typologies of student engagement. Some of these investigate very specific issues such as students' engagement with a group, the library, specific practices or teaching methods rather than engagement with their studies overall. Some (such as Solomonides and Reid 2009) adopt a definition of engagement which focusses on emotional issues, essentially ignoring students' behavioural responses. Some studies (such as Clarke, Nelson and Stoodley 2013; Martin 2007; Rashid and Asghar 2016) are concerned with models that measure engagement, rather than looking at its character and antecedents. Many studies use quantitative methods to derive statistical models. Some of these simply identify

correlations between data or clusters within the data which represent groups of students with similar characteristics, as a typology (such as Coates 2007). Some statistical studies produce models which identify factors in the data allowing the identification of features which appear to be related to engagement (such as Espinosa 2016; Hu and Kuh 2002; Hu, Ching and Chao 2011).

The current work is an attempt to understand why students, as individuals, respond in the way they do and to produce models which reflect that. A few authors have produced such models. Lent, Brown and Hackett (1994) developed a model of engagement which considers the relationships between factors leading to engagement and success. Their model shows that self-efficacy, outcome expectation, interest and goals (i.e. a sense of purpose) collectively support engagement, and that student achievement requires both engagement and self-efficacy. Whilst this model addresses psychological aspects it does not directly include contextual factors and does not seem to explain the responses of some students in this study.

Some previous authors, maybe based on factor analysis work (such as Ainley 1993), have considered engagement to comprise multiple dimensions. Trowler (2010) and Lawson and Lawson (2013) considered engagement to comprise three dimensions: emotional, behavioral and cognitive, with individuals positioned between positive and negative poles on each. However this does not incorporate motivation, which seems to be crucial to understanding student engagement. Kahu (2013) addresses this to a degree, identifying four dimensions: behaviour, cognition, emotion and a will to succeed.

3 Methodology

The models of student engagement presented in this paper arose from a project to investigate why, in the researcher's professional lecturing experience, some students seem not to enjoy any aspect of their computing course, and some individuals fail to thrive (Payne 2013). This project investigated student engagement issues. However since some student disengagement might be the result of them enrolling on an inappropriate course, the routes by which students chose to study computing were also examined. This project was approved by Coventry University's Ethics Committee.

Much work on student behaviours, such as engagement, uses quantitative methods. Whilst such studies may identify features and traits and correlations of factors, they tend to provide little, if any, illumination as to the roots of individuals' decision-making. This project was therefore designed to include discussions with students so that it was possible to explore issues with them, endeavoring to gain a deep understanding of their personal decisions and influences. A number of data collection methods (such as questionnaires and profiling) were used, creating 210 data items,

with the bulk of this data corpus comprising transcripts of over 100 hours of student interviews and focus groups. Participants were of three types: 29 students enrolled on a degree in some computing subject; 13 school pupils who were considering applying for a computing degree at some institution and 19 computing academics. Many of the enrolled students and all the potential applicants provided multiple data items. The findings presented here emerged from working with the enrolled student participants. Short profiles of these participants form Annex 1. Students are identified using pseudonyms. Analysis and interpretation of the data corpus led to the findings and the development of the models of student engagement presented here.

Analysis broadly followed a thematic analysis approach (Braun and Clark 2006). As data items were created they were encoded using ATLAS.ti qualitative data analysis software. Whilst there were no a priori codes (Bryman and Burgess 1994) attention was paid to issues which seemed to be relevant to the research's aims, such as reasons for, and connections between, students' behaviours and attitudes. Codes were frequently reviewed and modified, and grouped into themes, sub-themes and categories. Those related to the student engagement theme are presented as Table 1. Some examples from the data, which are particularly pertinent to this theme, are presented in the next section.

[Table 1 about here]

The models to be presented later were derived from this analysis using a process of interpretation and review, including comparison with, and inclusion of, findings from other authors. This work was supported by a novel technique, based on Actor-Network Theory (ANT) (for example, Callon 1986; Latour 1999; Law 1999; Law and Singleton 2005), which has been named ANT Analysis Diagrams (AADs) (Payne 2016). This is a diagramming technique which assisted with the identification of codes and categories during analysis, but particularly with their interpretation and the identification of relationships between coded elements. It supported the exploration of ideas and, through the resulting diagrams, making these concepts explicit. The models were created whilst trying to make sense of (and present) the nature of student engagement itself, and the factors which influence it, and drawing together evidence both from this project and the pre-existing literature.

Throughout this process, as an insider to the domain of the study, it was important to endeavour to consider the data with some objectivity: with fresh eyes. However '*an open mind is not an empty head*' (Dey 1993, 237) and views from personal

professional practice were allowed to influence this work, although hopefully not to blinker.

4 Findings

Analysis within the engagement theme highlighted that students often expressed the positive aspects of their relationship with their course by referring to things which were fun, exciting or, as these were computing students, innovative:

'Once I got to the practical it was fun' (Omar-2#122)².

'I did have that pleasure of getting things to work' (John-2#182).

'I loved the idea of making software' (Justin-1#41).

'Things like that amaze you' (Chris-1#19).

However, of course, not everything was engaging:

'The lectures weren't as engaging [...] [they] were quite dull' (Omar-2#122).

Other qualities which were problematic sometimes included the character of some computing activities:

'I think it's a bit too intense and repetitive' (Victoria-1#550).

'To a point it is [...] routine' (Michael-7#8).

The flexibility embedded into some practical aspects of their course was raised by several participants. Many clearly enjoyed it and found it engaging to be given tasks with a broad remit:

'There are like millions and millions of solutions to it, just the whole idea of you know... Your freedom of how to do the work the way you want was, you know... It's very exciting' (John-1#196).

'I think that what I find most enjoyable about it is you get that opportunity to explore things, you know, interests or something that you're not sure about, or you want to work more on and do that' (Carl-2#106).

'Before, you had to abide by the rules' (John-1#196).

However some students found loosely-bounded tasks not just novel but also disconcerting and problematic:

² i.e. Omar, interaction number 2, talk-turn number 122

'[The lecturer will] just put a path in front of you, like a crossroads and that's basically where you get to choose and where you want to go. [...] It takes a lot of getting used to' (Omar-2#178).

'When you look at the work [...] and say: "Well how much do I put into it? How much do I keep going?" It's quite hard, but: "Do I keep going? Do I keep trying?" [...] You look at this piece of work you've done and you'll say: "It's still not good enough" ' (Omar-2#32).

Omar was perturbed by the assessment being so flexible that it did not provide a clear end point. Thus in some contexts, and by some students, flexibility is welcomed and enjoyed but this is not always the case.

In this project there were a number of instances where a student felt that elements of the course content did not fit their personal needs. Generally this was a consequence of their pre-existing skills, typically in either mathematics or computer programming, being more developed than the taught curriculum: on these courses this is often the case for students from Eastern Europe. Sometimes this led to the student disengaging with that material. Dee, a student from Eastern Europe, who had not attended his first-year Mathematics module, commented:

'The maths over here is very, very, very, very, very simple. It's very simple, yes' (Dee-1#148).

Nhoj Xela, another Eastern European student who had also been absent from those classes, described the module as a 'joke', he felt it was so easy. Michael, a student with a significant background in programming, found his first year programming module to be very easy. He found this frustrating since he was keen to move on with his learning. These examples are not to suggest that these modules were (necessarily) set at an inappropriately low level. For both modules, a number of students commented that they found the material to be hard and some students were making good use of the available additional support facilities. James was absent from much of the module on computer usability. He had attended the first class only and did not see it as being relevant to computing:

'Well the thing is Design for Usability, I think only the first class was not that interesting but I didn't even bother to go to the second one' (James-1#209).

Not only did James fail to attend classes for this module he reported how his behavioral norm, across all modules, became that of absence. Quite early on in his course he simply stopped attending. He graphically described how his response to one class for one module had spread to influence his behaviour across his entire degree:

'You get used [to it] so you make it a routine to not go so... It is hard to get out of it' (James-1#215).

These examples highlight that student morale, attendance and engagement can be impaired if the material presented is perceived as not being relevant or is inappropriate to the individual's needs.

John was also frequently absent from the Mathematics module. He attributed this to the difficulty he has in arriving in time for his 9:00 class:

'I feel disappointed in a way that I keep missing out on stuff but [...] at least I'm devoted-enough to turn up [albeit late] and catch up on everything' (John-2#32).

John sees himself as a conscientious student who takes steps to try to catch up but is frustrated by the situation he finds himself in. He does not interact with this module in a conventional way but is keen to achieve mastery and is emotionally engaged. Borrowing from disability theory (Wendell 2006), he can be considered to be 'differently engaged'.

Pete, similarly, is perhaps most appropriately considered to be 'differently engaged'. He also was a persistent absentee but for him the difficulty lay with the teaching approach which led him to persistently miss classes:

'I could learn everything from the lecture slides [which are available online]. I was going to the lectures and I don't particularly like the way that [lecturer] teaches. [...] I'd rather fall asleep in the lectures and I wasn't learning much there' (Pete-1#488).

Students such as Pete can have completely opted out of the teaching delivery of a module and yet still be engaged with it in many ways.

5 Engagement Models

Using the themes, sub-themes and categories identified in the data corpus overall, as illustrated by these data extracts, three tentative new models of student engagement were developed to try to better understand student engagement and its influences.

There are numerous factors which affect whether, or in what ways, a student engages with their course and many authors have presented lists of such factors (for example, Bryson 2010; Dean and Jolly 2012; HEA 2012; Trowler 2010). However this project noted some additional factors which can also be significant. These factors can all be integrated into a force-field model (Cummings and Worley 2008), an approach adopted from organizational change theory. Here some factors (such as self-efficacy and confidence) are shown as encouraging engagement, with others (such as unappealing delivery and inappropriate content) working in opposition, resisting engagement (see Figure 1). (The relative importance of these factors will vary between contexts.)

[Figure 1 about here]

Many of the factors are very well recognized as being forces which encourage student engagement, such as appealing content and practical work, and those influences will not be further rehearsed here. This project recognized that inappropriate content or an unappealing teaching delivery can make it less likely that a student will fully engage. These should be seen as forces opposing engagement, alongside other factors which serve as negative forces, such as unappealing content.

A factor may influence individuals in different ways, perhaps providing a negative force against engagement for some, but not being deterministically negative for all students (represented in Figure 1 by dashed arrows). For example, the course regulation which means that the first year grades do not contribute to final degree classification will lead some individuals to see the first year as a 'qualification' year, where a bare pass is 'good enough' (Raftery 2013). They may not engage fully and may not strive to achieve their best. Other individuals may react differently (even if they are fully aware of the regulation) and see the year as an opportunity to develop academically or to test themselves, safe in the knowledge that they have that time before their results have significant consequences. This is in line with Kahn (2014) when he highlights that the impact of circumstances on a particular individual's engagement will vary depending upon their reflexivity: students themselves play a major part in forming their own engagement.

Kahn also commented that students vary in their response to the flexibility and requirement for creativity in tasks which are weakly-structured and in which they have autonomy, even if the tasks are authentic. Some students, such as John and Carl, were very motivated by an assessment brief which prescribed little and allowed them flexibility and choices, and provided them with the opportunity to bring their creativity to bear. For other students, such as Omar, such tasks were problematic since it was not bounded-enough. They wanted to know what was required of them and particularly they were unsettled by not having a clear end point. As Kahn notes, some students become overwhelmed by the uncertainty. Thus, flexibility can either drive or resist engagement, for different individuals.

In a similar way groupwork, in which students are required to work collaboratively, is well known to be enjoyed by some students, the collaboration supporting their engagement in the task and building a sense of belonging (HEA 2012; Trowler 2010). Conversely some students find it problematic and would very much rather not be asked to work in a group (Beaumont, Sackville, and Cheng 2004; Booth 2001; Kahn 2014; Molyneaux 2008). Thus, like flexibility, groupwork can be a force either driving for or against engagement, depending upon the individual. In this way the

force-field model presents the main factors for and against engagement which are known from the literature or found to be significant in this project. In other contexts additional factors may be identified.

It is not just flexibility and groupwork which evoke diverse responses. A particular student will respond in their own individual way to many of these factors, generating a personal engagement stance. Considering the diversity of such stances led to the second proposed model which illustrates that students' engagement can be on one of a number of levels (see Figure 2).

[Figure 2 about here]

Some students are fully engaged with their course. They attend and engage with activities in a way that suggests that they are fully committed in all respects (level 3). By contrast sometimes a student is totally disengaged from their course and does not exhibit any form of behaviour which suggests otherwise (level 0). Whilst such total disengagement is probably quite rare in most course cohorts, it has occasionally been encountered in practice. For instance, an individual may enrol on the 'wrong' course: one which is very different from their expectations. Whilst such extreme disengagement is quite unusual it is much more common to encounter students who are disengaged to a lesser extent.

Some students, such as James, find specific, individual elements of their course to be of no interest to them. This can lead the individual to disengage, but perhaps only from the relevant modules (level 1). The student may simply ignore the material completely, not attending any relevant classes nor submitting any assessments. This can occur if the student does not realize the significance of the material; if they believe that they already know the material or if they are simply not interested in that area of the degree's coverage. These students behave as though they do not think there will be any significant consequences in relation to completing their degree. (Of course the reality of the consequences will vary widely, from context to context.)

Yet another group of students, such as Pete and John, may behave in a similar way in that they do not attend regularly and may miss some assessments. These are students who are hoping to gain a 'pass' in these elements, as well as their degree overall, but are poorly engaged with the teaching process itself (level 2). They may not like the style of teaching delivery, or they may feel that some staff are not conducive to their learning or the timetabled classes may not fit well with their personal commitments. These are students who are 'differently engaged': engaged with this learning but in a manner different to that intended by the course designers.

The force-field factors generate an individual's overall engagement stance. However an individual's response to them is affected by (and may affect) a student's intrinsic

and extrinsic motivation (Yorke and Longden 2004; Alexander et al. 2011) (which are themselves two of the factors). For example, if a student encountered material where the relevance was unclear this might challenge their understanding of what the subject was about and reduce their intrinsic or extrinsic motivation. Conversely practical, applied material might reinforce or refine their conception and enhance their intrinsic motivation. Intrinsic and extrinsic motivation can be seen to be two components of student engagement which are explored in the third model of engagement.

As described earlier, a student such as John or Pete may find that their course is organized in a way which does not suit them (maybe through timetabling) and they might adopt a form of behaviour which can be described as being ‘differently engaged’. The motivations of such students are not necessarily diminished. Their intrinsic motivation to the subject and their extrinsic motivation from their learning and ultimate qualification aim are neither, necessarily, reflected in their personal behaviours. Their engagement with their course has been affected in a behavioral way, which can be termed ‘functional connectedness’. This can be considered to be a component of engagement (alongside intrinsic and extrinsic motivation) and is the way in which students make use of the range of learning opportunities. This connectedness would include attendance but also less overt opportunities such as asking questions, using support sessions and attending to feedback.

However, as many previous studies suggest, underpinning engagement is the more general concept of emotional connectedness. This is how the student views their involvement with their course and whether they feel part of it and that they belong. Such connectedness will be nurtured if the student experiences fun or enjoyment but discouraged if they experience an unappealing delivery. However such responses are very personal and individual. For example, groupwork will promote emotional connectedness for many students, although not for all.

Thus student engagement can be seen to comprise four components. For an individual student these can be seen as personal orientations which collectively form their connection with their course. These components are:

- intrinsic motivation in the course or in the subject itself;
- extrinsic motivation, resultant from the rewards anticipated from course completion, generating a desire to succeed;
- functional connectedness, which could in turn be considered to comprise separate elements such as attendance, submission, catching-up online, using support opportunities and
- emotional connectedness, including the personal effort expended to achieve mastery.

These components, or aspects of engagement, can be considered to be four separate dimensions which collectively form a profile of (dis-)engagement (shown in the third tentative model, presented as Figure 3).

[Figure 3 about here]

Figure 3(i) shows a possible profile of a single example student. The bar lengths represent the extent of each engagement dimension, as possessed by that individual. This example shows someone who has quite high intrinsic motivation but somewhat low extrinsic motivation: they have strong functional and emotional connections to their course. Each student lies somewhere on each of these four engagement components, or dimensions, giving their personal profile. An 'ideal', fully engaged student would be very high on all four dimensions (Figure 3(ii)) and the totally disengaged student very low (Figure 3(v)).

It seems likely that a limited number of shapes of pattern would frequently reoccur, representing coherent, logical engagement stances. For example, the 'differently engaged' student would have low functional connectedness but stronger emotional connectedness (see Figure 3(iv)). A poorly engaged student might still desire results of completing their degree, with high extrinsic motivation, even if other components of their engagement are low (such as Figure 3(iii)). The levels of engagement model described earlier (Figure 2) could be seen as relating to commonly seen dimension patterns. However the diversity of potential dimension profiles does suggest that those levels of engagement may merely reflect those profiles which are most common and evident. Indeed it seems likely that the prevalence and desirability of profiles varies between contexts and disciplines.

Whilst the four orientations are presented as separate dimensions, they are unlikely to be independent of each other. It is probable that there are logical inter-relationships between the dimensions in that some combinations do not seem to be plausible. For example, a student is most unlikely to have high functional connectedness if their other dimensions are all very low. It seems unlikely that any student would attend and adopt academically 'desirable' behaviour if they were not motivated to the course or its outcomes or have some emotional reason to do so.

It is not evident what the relationships are between the connectedness and the motivation dimensions. Indeed it may well vary between individuals. However such relationships are not reciprocal. For example, it is difficult to imagine a student who exhibits a good emotional connectedness without having a fairly strong intrinsic interest. However a student may articulate a clear interest in the content of their course (intrinsic motivation) without necessarily having much emotional connection with their course.

For many, if not all, students their profile will vary for different elements of their course. They are likely to be more motivated by some parts of their course than others. They may exploit more of the learning opportunities in some parts, and hence be more functionally connected to some parts, than others. A single student may thus have a number of distinct profiles. Additionally, an individual's profiles will tend to change over time. This movement will be influenced by the multitude of factors such as the student's learning experiences and the delivery of materials (Figure 1), as discussed previously.

6 Applications and Implications

These three proposed models of student engagement help to explore and expose the nature of student engagement, and the factors which encourage or militate against it. However their derivation raises a number of questions and issues: firstly, the concept of student disengagement. It is likely that no teacher would see engagement and disengagement as a simple binary: there are obviously degrees of engagement. However this work highlights that the character of a student's engagement has multiple factors and dimensions which should be considered.

Some institutions monitor students' attendance, and have chase-up and intervention processes, with the laudable aim of trying to improve students' levels of attendance and thereby achievement. Other institutions focus their attention on whether individuals are learning and are less concerned with student compliance (NAO 2007). Monitoring and chasing students does not always have the desired effect of encouraging absentees to attend and indeed can generate negative consequences (Payne 2013). For instance a student who is functionally poorly connected, particularly one who is frequently absent, is perhaps labelled as being disengaged when sometimes they should more appropriately be seen as being 'differently engaged'. Such mis-labelling can lead to inappropriate or unhelpful experiences or interactions with staff, as experienced by Pete, James and John (Payne 2013).

The application of these engagement models, using them as flexible, adjustable frameworks, could assist course managers across the disciplines, in their work supporting struggling students. This could be by helping to identify the engagement profile of struggling students, prior to deriving interventions and action plans which could be personalized, as far as necessary and practical. It is the diverse responses of individual learners which makes engagement such a messy issue to understand and address and where these models could assist. However the factors model in particular might be useful to course managers, adding any additional factors they discern, in identifying the source of any broader, more general engagement concerns affecting a cohort. The practical benefit gained by the adoption of these models in such activity could also serve to provide additional support for the models' validity or for their further development.

Deriving these models also raised questions as to the nature of the 'ideal' student. The dimensions of engagement model used this term to refer to an individual with maximal engagement in across all four dimensions. However the use of the term 'ideal' implies that this is the profile necessary for a student to maximize their learning and achievement, although it is not clear that this is the case. It seems probable that the dimensions are of varying importance to each individual student's learning and may differ between contexts. For example, in some contexts, for some individuals, a sub-maximal level of engagement on one or more dimension may be good enough to still maximise learning. For some individuals it may crucial that they have a substantial degree of emotional connectedness whilst for other students this may be very much less important. Thus there is likely to be no single profile which leads to every student achieving their best. As a fairly extreme example, extrinsic motivation is useful to a student in providing a general motivator but intrinsic motivation is more likely to generate the enquiring curiosity characteristic of a model student. Thus significant extrinsic motivation may not always be essential for maximal, or even substantial, learning.

The benefit of an emotional connection is well recognised in the literature (HEA 2012; Northumbria University 2011; Pierson 2013; Ramsden 1998; THE 2009; Trowler and Trowler 2010) and indeed Tinto's concept of social and academic integration (Bryson 2010) considers that it is not just beneficial to learning but an essential pre-requisite. Dean and Jolly (2012) are clear that it is this emotional connectedness which is important for learning, rather than students' behaviours. The relative importance of functional connectedness would appear to be context dependent, as well as student dependent. For example on some courses there will be sessions and activities which are difficult, if not impossible, to substitute for if missed. However there may be some courses where this is not the case, which can be studied perfectly effectively in alternative, non-conforming ways.

Student emotional connectedness is thus an important dimension of engagement. It can be encouraged by activities such as developing appropriate relationships between students and between staff and students. The aim should be that students feel comfortable on their course and that they feel that they belong: *'belonging is critical to student retention and success'* (HEA 2012).

The current project was located within computing. Unlike some other disciplines, most aspects of computing are not predicated on an emotional engagement. There is a risk that a deep emotional involvement is seen as being in some senses optional, by both some staff and students, who might see learning as being just about skills and knowledge acquisition. Kahn (2014) highlights that students pursue diverse 'goods' in their course. For example, some students' aims include the formation of new relational attachments. However James and Pete both clearly saw their course as being simply the completion of all their assessments. As long as they achieved decent marks they were content. They were keen to successfully complete their degree but

sought nothing more from their course. Since courses are often structured so that grades on formal assessments, alone, directly determine the final degree result, these students' attitudes were understandable. The structuring force of these academic regulations supports any student who adopts such a strategic view of their course. However, as the literature suggests, it is likely that both these students would achieve more, both in terms of grades and their learning, if they were involved more deeply.

Whilst emotional connectedness can be seen as optional by some computing students, there are other disciplines where it may be fundamental to engagement: nursing may be one such example. Whilst these proposed engagement models do not distinguish between disciplines, the balance of significance of factors and components probably differ between disciplines. Nonetheless it seems likely that the models will have value and application across the disciplines.

The models have scope for further development and could be modified to better support investigations in other contexts. Most obviously additional factors could be included in the force-field model or some of the broader factors broken down. For example, some applications may find it useful to decompose 'course organization' into a number of separate factors. The models could be further augmented. For example the force-field models are amenable to using varying lengths and widths of arrows to represent the importance and strength of each force. This could help highlight the key issues. Similarly the dimensions model could be drawn with varying widths of bar, reflecting the importance of each dimension for a particular individual.

Whilst the models have been presented as provisional they seem to be valid in their originating context since they were useful in gleaning credible understandings of the behaviours of those students from which they were derived. However their broader applicability needs to be demonstrated. As with all such studies there are caveats and limitations. To encourage openness and honesty participants were reassured about the confidentiality of their contributions. The understandings gained were credible in that they fit the evidence and 'made sense' in relation to previous studies. The qualitative methodology employed gives no sense of the prevalence of the features identified: all that is claimed here is that these features seemed to exist in the student sample used. Whilst efforts were made to ensure the student sample was as diverse as possible it cannot be taken as being random or even fully representative. A different sample from the same student population might even yield some additional factors. Similarly, whilst the models should be widely applicable across disciplines, the balance and significance of elements may differ, and additional factors might be identified. Whilst suggesting that the models should be useful as exploratory frameworks across most of the range of Further and Higher Education contexts, their value does need testing in practice.

The scale of potential application could vary, considering engagement in either whole cohorts or individual students and either entire courses or specific elements. They are

tools which course managers may find useful in their student support work, guiding and reminding them of the multiple factors involved in the complex sphere of student engagement. For example, the introduction of groupwork or flexible coursework may be being considered but the force-field model identifies that there may be some students who might find that problematic. The dimensions model may remind that extrinsic motivation, no matter how powerful, may not alone be enough for a student to connect to the course.

The models do not offer a panacea for engagement concerns: they are tools which may assist. In particular a complication in the application of these models is that students are individuals and, as such, each reacts in their own ways. What matters for each student and what assists with their learning is unique. Supporting students to good engagement thus, ideally, should be on a student-by-student basis in which the models could help identify problems and thereby support the identification of any necessary remedies. For example, the dimensions model may suggest that a student who is poorly functionally connected, and misses many classes, may still have a strong desire to succeed.

7 Conclusion

This paper has proposed three new, interrelated models of student engagement which consider various facets of its nature, presentation and generation. These models help in understanding the multi-dimensional nature of engagement and draw together different aspects of engagement explored in previous work. However the value of these models is not confined to the theoretical. They could be adopted as flexible frameworks in the practice of student support across Further and Higher Education. The models highlight the individual, personal nature of behaviour concerning engagement, reflecting the constructed identities of individual students and the need for careful consideration of any interventions planned at the individual or group level to minimize the risk of unintended negative consequences. The models thus far have been used in one project, only, where they provided a useful explanatory tool. Their application in student support activity, in any discipline, would serve to develop them further, as well as exploring the extent of their validity.

Acknowledgements

This paper is based on work developed in the author's PhD thesis (Payne 2013). The author wishes to acknowledge the useful comments received from the anonymous reviewers of earlier drafts.

(Word count 7207)

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Author Biography

LISA PAYNE taught Computer Science for many years in the School of Computing, Electronics and Mathematics at Coventry University and remains an Honorary Lecturer in the school. Her main current area of interest is the education of computing students.

Annex 1: Profiles of Participants

Participant pseudonym	Research thread(s)	Gender	Course (or type ³)	Year of course	Comments (including entry qualifications where ascertained)
Arthur	Engagement	male	Computing	1	recent immigrant from Far East
Avtar	Focus Group	male	Computer Science	1	immigrant from Africa when aged c16, mature, BTEC National IT
Carl	Focus Group	male	Computer Science	1	mature
Chris	Focus Group	male	Computer Science	1	A-level ICT
Dee	Engagement	male	creative	1	Eastern Europe; A-level Computing (equivalent)
Ez	Engagement	male	Computing	1	A-level ICT
Farouk	Focus Group	male	Software Engineering	1	immigrant from Middle-East when aged c16, HNC Computing
Fidel Angel	Engagement	male	Ethical Hacking	2	Middle-East; mature
Imogen	Image	female	IT and Computing	1	
Innocent	Focus Group	male	Computing	1	GCSE IT
James	Engagement	male	Computer Science	1	Eastern Europe
Jay	In module	male	Computer Science	1	A-level ICT
John	Focus Group	male	creative	1	BTEC Software Development (level 3)
Justin	Focus Group	male	creative	1	AS Computing; BTEC National IT practitioner
Les	Image	male	Computer Science	2	
Martin	Focus Group and In Module	male	Computer Science	1	disability; BTEC ICT
Matthew	Focus Group	male	Computing	1	A-level IT (equivalent), mature, Eastern Europe
Michael	Focus Group and In Module	male	creative	1	mature, employed in IT, Access entrant
Myndtrick	In module	male	creative	1	Eastern Europe; extra-curricular courses in school
Nhoj Xela	Engagement	male	Software Engineering	2	Eastern Europe; mature
Nick	Engagement	male	Computer Science	1	Eastern Europe
Nicole	In module	female	creative	1	GCSE ICT
Omar	Focus Group	male	creative	1	BTEC National IT practitioner
Pete	Engagement	male	Computer Science	3	mature

³ Creative courses: Games Technology, Multimedia Computing, or Creative Computing

Raith	Image	male	Computer Information Technology	unknown	
Richard	Engagement	male	Computer Science	1	Middle-East
Tad	In module	male	Ethical Hacking	1	Very little input; mature; African
Trevor	Image	male	New Media module	2	
Victoria	Focus Group and In Module	female	Computer Science	1	A-level ICT

Theme: <i>Engagement</i>	
Sub-theme	Categories
1. The engaged student	intense, repetitive, innovative or fun
	flexibility
2. Disengagement - causes and manifestations	subject does not fit needs - mathematics
	subject does not fit needs - programming
	absenteeism
	peer groups and habitus
	assessment - activity-led learning
	assessment - first-year contribution
	the disengaged student
3. Staff responses to (presumed) disengagement	labelling
	infantalisation

Table 1: The Engagement Theme

driving forces,
for engagement

resisting forces,
against engagement

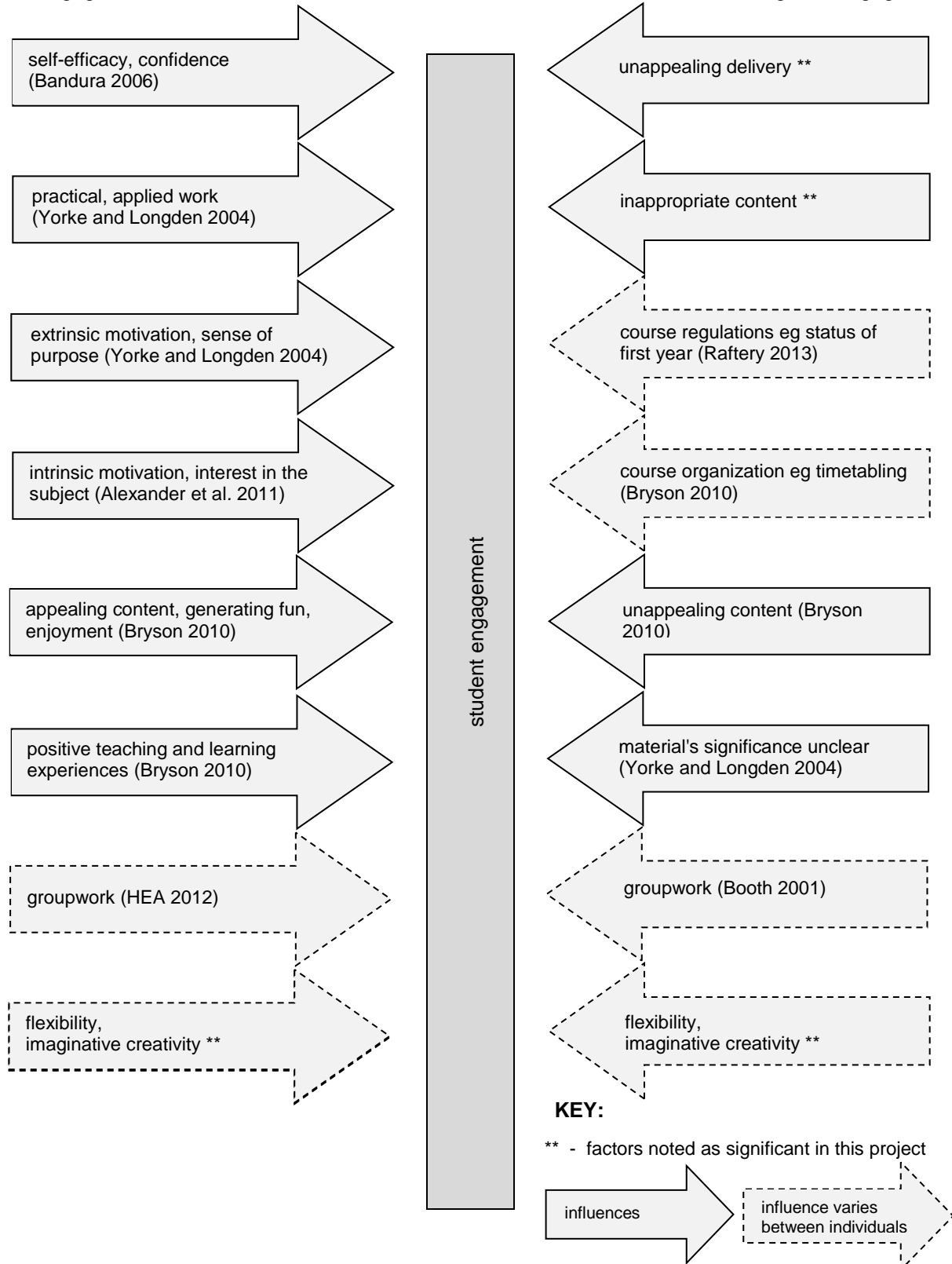
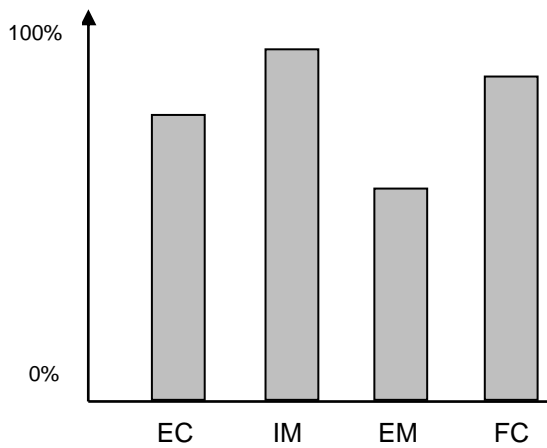


Figure 1: Force-field model of factors influencing students' engagement

0%	levels of engagement	0	disengaged from whole course (may be on wrong course)
		1	disengaged from the content of a few modules
		2	disengaged from the teaching process (differently engaged) (perhaps do not like teaching approach or timetable difficulties)
100%		3	fully engaged and committed

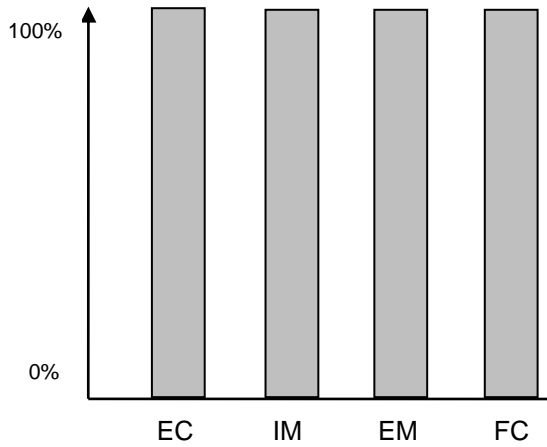
Figure 2: Levels of engagement



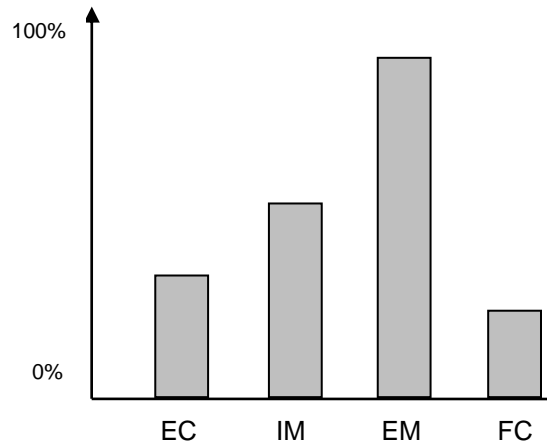
KEY

EC	Emotional connectedness
IM	Intrinsic motivation
EM	Extrinsic motivation
FC	Functional connectedness

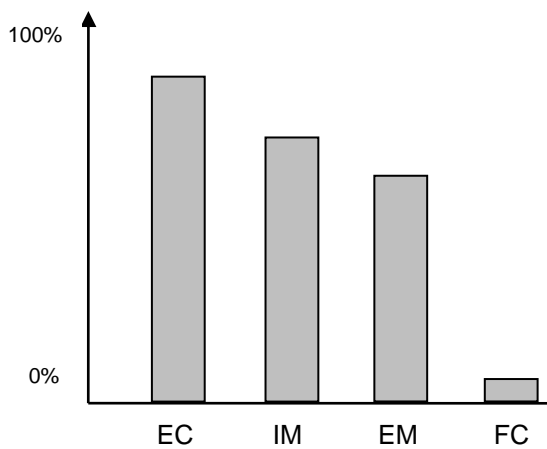
(i): an example student profile



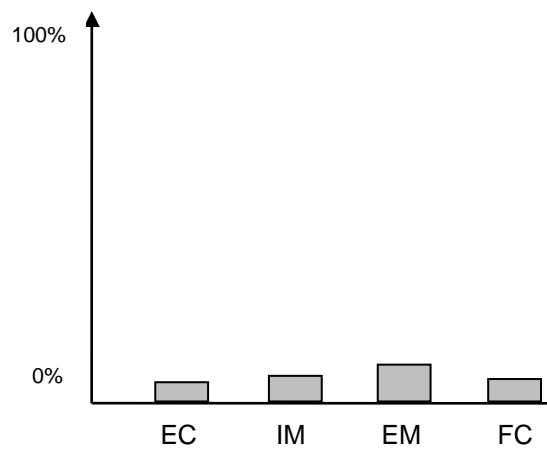
(ii): an 'ideal' student



(iii): a poorly engaged student



(iv): the 'differently engaged' student



(v): the totally disengaged student

Figure 3: The dimensions of (dis-)engagement.

