Table Two: key webapp content areas – for RO and ETM students on placement

Key information/content for RO	Key information/content for ETM
Cognitive	
Anatomy and technical information, including on interpreting CT scan images and in anatomical diagrams	Legislation, licensing and insurance information associated to ETM
Side effects of RO treatments	
Glossary of RO specific terminology and abbreviations	Glossary of financial terminology
Practice or revision content and questions from clinical practice tutorials	
Principles of physics	
Behavioural	
A handbook of RO related competencies e.g. on positioning the patient, use of the CT scan, moving equipment safely	ETM checklists and templates including for budgeting, writing press releases
Communication skills for working with RO patients such as how to explain treatment in patient-friendly, non-technical language, key phrases to use	How to create and build a CV
'Do's and don'ts' gathered from previous students	How to undertake marketing activities, such as writing for different promotional formats
Understanding of the typical patient journey and sequences in treatments	How to complete a risk assessment
	Developing key skills, such as networking
Affective	
Managing difficult, nervous and apprehensive patients	Personal wellbeing including hours worked, dealing with uncomfortable situations
	How to recognise own strengths and weaknesses
	A means to stay in touch with cohort peers while on placement

Cognitive (declarative) knowledge resources identified for the webapps, included: a glossary of terms; specialist vocabulary pertinent to the subject area; specific images and diagrams; plus explanations of video clips on patient positioning skills, anatomical diagrams or images, radiographic images (specifically for the RO students).

Behavioural (procedural) knowledge resources includes: advice on communication with relevant personnel and with key stakeholders and users; checklists and protocols; key contact information for the specific placement context; and details of relevant, specific procedures (as pertinent to RO or ETM students).

Interactivity in the webapps included opportunities for the pilot students to also rate the resources used on the webapps, in terms of value to them, as a means to help evaluate the actual resources provided.

are literally to hand as scaffolds, affording students opportunities to be directly self-regulating their learning. This can also include access to organisational information that might be needed while on placement, especially when on placement for the first time.

This solution suggests providing undergraduate placement students with access to digital content sources, in timely and expedient ways. Access to digital content and skills-based resources, with navigable links to broader information resources, offers a contemporary and innovative solution to this problem, in the form of a digital web-based application (webapp). A webapp enables a significant range of digital content to be accessible 24/7, literally to hand via mobile devices, as well as in a variety of formats i.e. as text, images, graphs and photographs, video and audio. A webapp can potentially afford interactive forms of student engagement with content.

PlacementPAL offers an effective and contemporary means to help scaffold students' cognitive, behavioural and affective confidence; knowing resources are readily and flexibly accessible to enable them to better act autonomously in the work context, in self-regulating their learning.

The conditions associated to this PlacementPAL solution include having both tutor knowledge and technical support to design and populate the webapp with relevant content and resources in a variety of formats: eg in video, images; text and audio, etc. Functionality also needs to be specified but includes: e.g. in a consistent design and interface for multiple devices; in intuitive navigation and structure; and in interactivity features for the user. For the digital webapp to be fully utilised, it is also important to determine that there will be ease and reliability in access from multiple placement locations, via students' smartphones, tablets and/or laptops.

PlacementPAL emphasises the learning value and status afforded in peer assisted learning (PAL): by eliciting content from more knowledgeable students with direct experience from undertaking a placement(s) already. Students with placement experience can suggest the kinds of content resources they found useful (or those that would have been beneficial) for more confidently transitioning into work contexts and in self-regulating their learning. It is important to understand problems and challenges from the students' viewpoint, as well as to be able to claim authenticity for the webapps to those students who would use them (see in the Examples section, below).

Therefore, elicitation of perspectives from more experienced, cognate students is recommended e.g. in running student focus groups. We also recommend involving relevant, experienced students to help source and co-curate the content for the webapps and to contribute to the design, in features and functionality. We see this as mutually beneficial, in also enabling more experienced students to further elaborate, consolidate and refine their own knowledge and understanding.

Examples

The use of this pattern and solution are proposed as a starting point for HE course teams who have work placements, practicums or internships as part of undergraduate programmes, who are considering ways to enhance students' transition into work contexts, not least by building students' confidence to self-regulate from ease of access to relevant content and scaffolded support in knowledge-based resources.

As 'proof of concept' for the solution, two webapp examples have been developed and piloted for:
(i)   Students required on BSc (Hons) in Radiotherapy and Oncology (RO), to undertake pre-arranged work placements within the National Health Service (NHS), commencing from Level 4.
(ii)   Students required on the Level 5 Applied Event and Tourism Practice module of the BA (Hons) in Event and Tourism Management (ETM) degree programme, to undertake relevant self-arranged placement(s) or work-related projects.

We used these two discrete and distinctive contexts as a means to consider both the generic and the specific factors in developing and implementing the solution in its first iteration. Cognate students, with prior placement experience, worked with the programme tutors to identify, curate and create relevant content sources for each webapp. The content was chosen help scaffold students' learning while encouraging them in self-regulating, as they commenced on placements. Tutors confirmed the accuracy and relevancy of all content prior to its uploading onto the webapp. Testing of the webapps both on multiple devices and at placement locations was also undertaken to ensure access was consistent, reliable and robust.

thereby helping to make placements a positive and successful experience for both students and employers.

Analysis of the Problem:

A conceptual framework has been utilised to identify the factors associated to the problem of students' lack of self-confidence and sense of readiness for work placements. If we want students to be acting confidently and self-regulating their own learning in the work environment, we need to look at what scaffolding might be offered to better enable this. A fine-grained categorisation of student needs, drawn from literature and tutors' experience in relation to workplace learning, has identified factors within three broad categories of: cognitive, behavioural, and affective or identity aspects.

Cognitive needs relate to students having access to relevant, theoretical content knowledge that students have been acquiring on their degree programmes but also in being able to understand its application in the practice settings, especially in linking theories with practice.

Behavioural needs relate to students taking actions in the performance of relevant skills, following context-specific routines and organisational practices. This includes developing students' communication skills, in learning how to convey information to different audiences, such as to managers, colleagues and/or to patients or clients.

Behavioural support needs can also relate to students' information literacy and digital literacy skills in having access and being able to find relevant physical or virtual resources, in content knowledge and skills information to support any (perceived or actual) knowledge lacks. Students may need practical support in acquiring or developing their technical skills, including in use of any specialist equipment.

Students will appreciate support in understanding the cultural norms and expectations of the workplace. This includes understanding the organisational structure and the roles and routines of those colleagues with whom they are working, as well as their own role and responsibilities. It includes support for students in learning to manage stressful situations and to deal with non-anticipated situations (Junek *et al*, 2009; Mackay *et al*, 2008).

Affective needs can be associated to both emotional aspects and in the development of a pre-professional identity (Jackson, 2017). This include supporting students to develop positive relationships with colleagues, supervisors and/or patients or clients

This includes support in how to manage conflicts and in understanding workplace stress, as well as in safeguarding themselves both physically and emotionally (Maidment, 2003).

Affective aspects closely align to the learner's self-regulation, in their ability to self-reflect and to be self-aware of their own actions while on work placements. We may need to help students to 'follow formulas' by observing and imitating behaviours gleaned from external cues including supervisors, but also in encouraging students to start to increasingly to self-regulate, including by reflecting internally on their actions and on their evolving professional identity.

There is likely to be both plurality and diversity in any support needs (whether cognitive, behavioural and/or affective) for individual students, as well as needs being contingent upon the specific placement context, and the nature of the work role being undertaken.

Traditionally, on many HE/FE programmes a placement handbook will be provided to students, often in hard copy form. This can be cumbersome for students to carry while at work. Even in digital form, placement handbooks tend to focus on organisational and basic, procedural information. They are often premised on providing standardised and generic information that any student across a particular programme of study might require.

The Solution (including context and conditions)

The solution proposed is to provide individual students with flexible access to relevant cognitive (declarative and procedural) knowledge in digital content resources, to enable undergraduates to independently refresh their understanding while in *the context* of work placements, especially when undertaken for the first time. This access will give students' confidence in knowing content resources

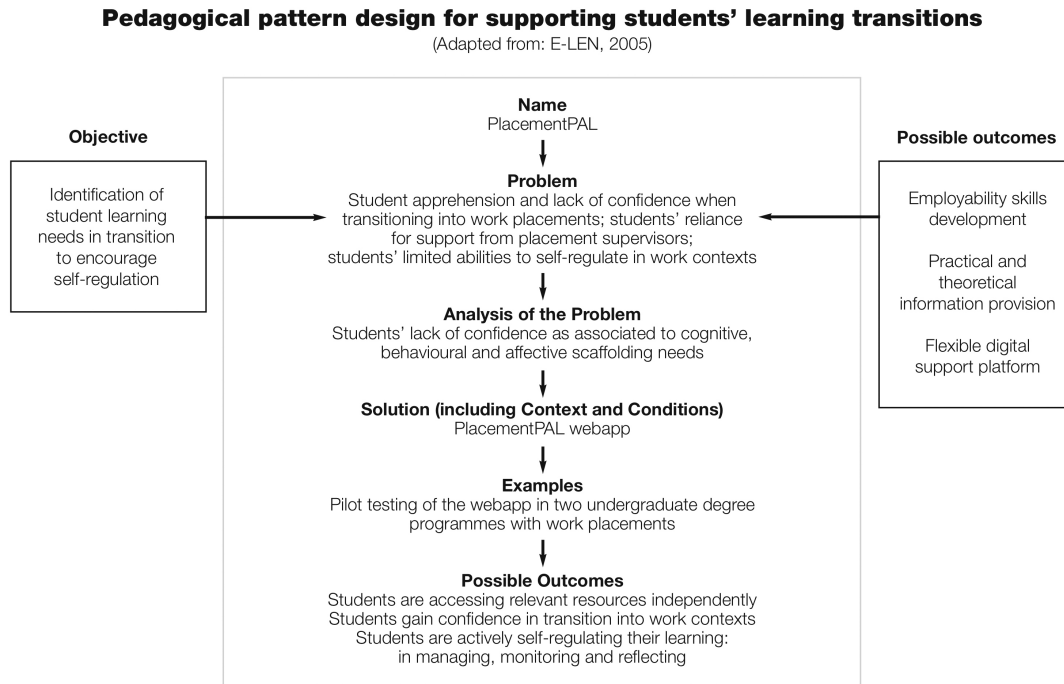Figure 1: Outline of a pedagogical pattern (adapted from E-LEN, 2005)

Pedagogical pattern design for supporting students' learning transitions
(Adapted from: E-LEN, 2005)

Objective

Identification of student learning needs in transition to encourage self-regulation

Name
PlacementPAL

Problem
Student apprehension and lack of confidence when transitioning into work placements; students' reliance for support from placement supervisors; students' limited abilities to self-regulate in work contexts

Analysis of the Problem
Students' lack of confidence as associated to cognitive, behavioural and affective scaffolding needs

Solution (including Context and Conditions)
PlacementPAL webapp

Examples
Pilot testing of the webapp in two undergraduate degree programmes with work placements

Possible Outcomes
Students are accessing relevant resources independently
Students gain confidence in transition into work contexts
Students are actively self-regulating their learning:
in managing, monitoring and reflecting

Possible outcomes

Employability skills development

Practical and theoretical information provision

Flexible digital support platform

Table 1: A pedagogical pattern for scaffolding students' transition into work

placements and promoting learners' self-regulation

Pattern Name: **Scaffolding HE/FE students' transitions into work placements: PlacementPAL**
The Problem: Literature, student feedback, tutors' experiences, as well as feedback from employers, tells us that HE or FE students often lack confidence about their knowledge and skills for the work context. Difficulties in being able to apply abstracted theoretical knowledge, as learned in the HE/FE context, to the practical and evolving situations of the workplace are regularly foregrounded by tutors, students and employers. Students often suggest they need support, especially in first placements, in developing their confidence and abilities to transfer relevant cognitive or theoretical (declarative) knowledge acquired from their HE studies to the practical (procedural) and contingent knowledge needed in professional contexts and practical work situations. We associate this lack of confidence with reluctance and apprehension from learners in taking action to self-regulate their own learning. Students have reported feeling unready and uncertain about what is expected of them as they commence on first placements. Students can be heavily reliant upon busy supervisors or other work colleagues to follow and copy their practices and to explain procedures to them. We suggest unreadiness and confidence lacks are associated to students' more limited ability to actively manage and self-regulate their learning, as they move into environments of which they are more uncertain and in which they have yet to understand fully their role and the relevant knowledge, behaviours and affective attributes that will be required of them. Meanwhile, evidence from employers suggests they find students often lack self-regulating abilities to deal with complexity, self-manage and take initiatives. This 'problem' therefore concerns ways to enhance and scaffold support to students, to better help them make effective transitions into work-based learning, in encouraging them in self-regulating, and

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its solution are proposed as a starting point for HE course teams who have work placements, practicums or internships as part of undergraduate programmes, who are considering design in systematic ways to enhance students' transition into work contexts, not least by building students' confidence from self-regulating their own support needs, including from ease of access to relevant content and knowledge-based resources.

A value in the pattern is that it affords more sophisticated iterations and elaborate interpretations in the solution, particularly in relation to more precisely 'scaffolding' support to placement students and in promoting reflection on learn ing in placement contexts. For example, a more refined version might offer students calibrated scaffolding (Pea, 2004), through to fading of such support, that is more closely matched to individual student needs and that promotes students to explicitly and critically engage in self-reflection on their (pre-) professional identity formation.

A first prototype solution from the pattern in the webapps has been piloted following development of specific content, working with student leads as partners (see e.g. Nolan & Doolan, 2018a and 2018b). There are also opportunities for the adaptation and piloting of the pattern and its webapp solutions, in other disciplinary contexts where placements feature. In addition, a longer-term goal, would be to develop more sophisticated solutions that further encourage students in self-regulation and in building their professional identities. This might include not just access to resources, but more actively supporting students to manage and monitor their actions, reflect on them, leading to new goal setting and ongoing learning and identity development.

informed content adds reassurance, in both authenticity and contemporary relevance. The pattern foregrounds the selection of content that more experienced students believe is important for supporting students on placements, rather than being prescriptive and placing reliance on the potentially ossified conceptions of for example, tutors or placement providers, about students' placement needs.

The use of student-informed content is a key contribution in the PlacementPAL pattern, aligned specifically with the 'analysis' aspect in the pattern, which identified the importance of meeting the cognitive, behavioural/procedural and affective support needs of those students experiencing work placements for the first time, and to encourage students to increasingly manage their own support needs as exemplary of self-regulation in learning. As previous participants in work-based placements, the student leads were ideally situated to advise and guide on authentic placement support needs for new cohorts on each of the programmes of study.

Summary and recommendations

The development of a pedagogical pattern has been the focus of this paper. We argue this is a critical design activity. The elicitation of knowledge around authentic experiences of student placements has informed the pedagogical pattern and offers a contribution to understanding around promoting learners' self-regulation when scaffolding students' transition into work placements.

PlacementPAL illustrates a systematic approach to pedagogical design of an applied, practice-based and student-oriented solution, by scaffolding support and promoting students' self-regulation when commencing work placements. The pattern enables us to act on the recognised and authentic issues associated with students' transition into placements and work contexts. The use of this pedagogical pattern and

Developing a pedagogical pattern for scaffolding transition to work placements

The pedagogical patterns approach asks design teams to systematically scrutinise the factors that might inform or impact on a problem (the forces) and by doing so, help the development of a solution in both method and artefact for a particular learning context. The approach offers utility in that design solutions can be refined and adapted for other contexts in which similar problems occur, such as other placement contexts.

The pattern we have created seeks to strike a good balance between rigour and prescriptiveness, in offering useful guidance, without constraining creativity in interpretation, in a solution. The context for the problem is especially important, in helping constrain and communicate the nature of both the problem and in determining a specific solution. Therefore the PlacementPAL pattern solution consists of both generic and distinctive aspects, with specificity determined by those contexts in which the pattern will actually be used.

The pattern approach to design has been deliberate in PlacementPAL and the overarching pattern we have presented remains available, including for its appropriation to other subject areas or disciplines, within which bespoke and tailored PlacementPAL webapps might be utilised. The pattern offers an effective and contemporary, digital form of scaffolding support via students' own electronic devices such as a smartphone, tablet or PC; that encourages learners to act more independently and confidently through having flexible access to theoretical and technical knowledge resources. The pattern also scaffolds support in students' use of procedural knowledge resources such as templates, checklists and guides.

This pattern has also been premised on utilising perceptions drawn directly from other students' prior experiences of work placements to add authenticity and to foreground the importance for support to be student-oriented in its focus. Student-

how they had found information when it was needed on their placements, including on the kind of information sought and whether they had sought help from others, or had acted more independently in finding resources or information for themselves.

A sub-set of the focus group students, from both the RO and ETM courses, were recruited to work as student leads alongside the PlacementPAL team in development of the webapps. The focus group transcripts were analysed with the student leads directly involved, to identify course-specific content or resources that might be provided on the webapps. The RO and ETM students identified the following aspects (in Table 2, below) as high priority content for the webapps they felt would have been helpful to support them when commencing placements. We have categorised these examples of content in relation to cognitive, behavioural/procedural and affective aspects and it can be seen that RO students placed a strong focus on cognitive resources especially relating to human anatomy, while both RO and ETM students emphasised the need for support for processes and procedures, with ETM students highlighting the value of templates provided by tutors, to help structure their planning and activities.

[Table 2 here]

Student leads subsequently were involved in sourcing, curating and writing content for the webapps, derived from the focus group analyses. The aim was to ensure the content reflected the kind of information and its format, that they felt would be relevant, supportive and empowering for newer students experiencing their first work placement. Once created or found, the course leads checked all content for accuracy before uploading to the webapps.

of approximately three months each academic year, commencing from level four of study (first year). By contrast, level five ETM students (second year) are required to undertake self-arranged placements or work-related projects over several weeks, as a component of the Applied Event and Tourism Practice module.

Firstly, we invited students who had already been on placement, on the two courses (RO and ETM), to attend a focus group meeting. Two focus groups were held with ETM students with thirteen students attending in total. One ETM focus group involved eight level six students (third year) and one group involved five level five (second year) students. Meanwhile, two focus groups were held with RO students and sixteen students attended in total. One RO focus group involved eight students, all studying at level five (second year), while the other focus group involved eight level four and level five (first year and second year) students. All focus groups were recorded and transcribed for qualitative analysis by the project team.

Each focus group meeting was intended to explore students' experiences of placements, identifying perceptions of additional support or information needs these students would have valued as they commenced their placements. We asked questions relating to students' views on any cognitive aspects or declarative knowledge, such as theoretical or technical information they would have found helpful. Students were also asked about support needs in terms of behavioural aspects and procedural information in, for example, having access to guidance on skills and processes. The focus group members were asked about needs in terms of managing communication and in building relationships in the placement context. They were also asked how they had found out about the cultural norms of the workplace context and whether there had been any issues in settling into the environment, establishing themselves in the work context, or any unexpected demands made of them. Students were asked to describe

[Table 1 here]

It should be noted any instantiations of this pattern as solutions will also need to draw upon the requirements of *inter alia,* the specific degree programme, the particular groups of learners and the context(s) of the placement. Importantly in the pattern design, we recommend eliciting the perceptions of cognate students as peers, who have experienced work placements, to determine both specific and authentic content and resources for each webapp solution.

The PlacementPAL pattern has therefore been premised on utilising perceptions drawn directly from students' prior experiences of work placements. Thus, working with students as producers in two distinctive contexts, was an "*organising principle*" (Healey *et al,* 2014: 2) for preparing the content of each webapp. The concept of students as producers, is defined as: *"undergraduate students, working in collaboration with academics… in the production of work of academic content and value"* (Healey *et al,* 2014: 2/3*).* This approach ensured a form of peer assisted learning (PAL), increasing authenticity, as well as to inform appropriate and useful content in the webapp solution.

To implement and pilot the PlacementPAL pedagogical pattern solution (outlined in Table 1), the development of web applications (webapps) was undertaken for two courses at the University of Suffolk: BSc (Hons) Radiotherapy and Oncology (RO); and BA (Hons) in Event and Tourism Management (ETM). These courses both contain work placement components, though these are distinctively different placements. The RO course includes pre-arranged work placements within the NHS,

The solution also looks at the context(s) in which it is applicable. Conditions need to be identified in terms of any success indicators or factors that would influence use of this solution, as well as the resources needed in solving the problem. Finally, examples are used to help illustrate contextual application of the solution.

[Figure 1 here]

A pedagogical pattern exemplar for supporting students' transition into work placements

A pedagogical pattern has been designed as a high-level resource for use by HE/FE tutors when supporting undergraduate students' transition into workplace contexts, such as on work placements. The pattern uses the five aspects of a pedagogical pattern structure (as depicted in Figure 1, above) and proposes a webapp solution. The webapp makes use of peer-informed and sourced content to act as a scaffolding tool solution. The webapp seeks to promote learners' self-regulation in workplace learning settings. Table 1 below, presents the emergent pattern.

The overarching aim driving pattern design in the PlacementPAL project was to use the identified challenges faced by students commencing placements to determine students' needs in making transitions to work contexts, recognising the sources underpinning students' expressions of anxiety, lack of confidence and uncertainty need to be closely inspected. Our literature review had identified these challenges were omnipresent across the HE and FE sectors but offered far less clarity on how we might rigorously address the support needs in order to scaffold transition and to promote students to be more independently directing and managing their workplace learning, as a form of self-regulation.

Puntambekar and Hübscher (2005) wisely caution that scaffolding risks being impoverished if the tools used do not include the critical elements of ongoing diagnosis, calibrated support, as well as in the fading of support. The emphasis on scaffolding to be designed around a pluralistic understanding of students' support needs and based on analyses of both evolving and diminishing learner needs for support, have been taken forward into the design of the pedagogical pattern for scaffolding learner support when transitioning into workplace learning.

Discussion: Pedagogical patterns in practice

A pedagogical patterns approach was used to optimise initial design work in the PlacementPAL project, offering a systematic but non-prescriptive approach to address common and recurrent teaching or learning problems (Goodyear & Retalis, 2010; Zenios & Smith, 2010). Educational problems recur, such as the problem of students facing and managing challenges when transitioning into work placements. Equally, problems often occur in slightly differing forms each time, so solutions also need to be context-specific to be meaningful and adopted.

A pedagogical pattern seeks to balance guidance with creativity, by creating a blueprint of an educational problem, from which context-specific solutions can be developed and applied. For example, the pedagogical pattern outlined below is proffered as a means of bridging between theory and the empirical evidence from employers and students on placements *and* the practical problems in educational design for scaffolding support of students moving into work placements. Pedagogical patterns are normally made up of at least five key aspects as outlined in Figure 1, adapted from the EU E-LEN project work on pedagogical patterns (E-LEN, 2005). A pedagogical pattern commences with its name, followed by a statement of the problem it addresses, before a more thorough analysis of the problem and a proposed solution.

Scaffolding as support for workplace learning

Scaffolding is conceptually described for educational contexts as a means to control elements beyond a learner's capacity, so the learner can focus on and complete those elements within their current range of competence (van de Pol *et al* 2010; van Merrienböer & Kirschner, 2017; Puntambekar & Hübscher, 2005). Scaffolding might be enabled through physical or virtual devices, or in following strategies that help sustain a student's learning, especially when dealing with complexity and novel situations, such as when commencing a work placement.

Greenfield (1999) characterised scaffolds as offering support, by functioning as a tool to assist the learner. Scaffolds can help extend the range of the learner, so allowing the learner to accomplish a task not currently within their grasp (van de Pol *et al,* 2010). A scaffold can be a device used selectively, as needed by the learner. Examples of scaffolds can include e.g. worksheets or checklists, used to reduce extraneous cognitive load upon the learner (Sweller, 1988).

Scaffolding has also been associated to fading of support (Pea, 2004; Puntambekar & Hübscher, 2005). As support needs reduce, a corresponding diminishing in support given is needed, with the learner moving from reliance on external guidance, towards internalised guidance and direction as characterised in self-regulation. We argue fading of support can neatly connect to the phases in pre-professional identity formation (Jackson, 2017) discussed earlier. Scaffolded support can fade, as the learner moves towards self-regulation of their actions, when relevant knowledge or skills become internalised and increasingly part of the learner's pre-professional identity.

eventually developed into students being able to *"originate"* (ibid, p7) and undertake work-based tasks as genuine contributions to the team. We suggest students need to be self-regulating those actions, by monitoring their own performance and reflecting on them.

We have identified that development of self-regulation in placement contexts corresponds with Jackson's (2017) views on students developing a pre-professional identity (PPI). The core elements of PPI include the ability to reflect, being self-aware and a critical learner; all of which have resonance with self-regulation. Jackson suggests placement learners commence by 'following formulas', being reliant on external cues, such as watching and imitating the behaviours of others such as a supervisor, that might also be described as a form of mimetic learning (Billett, 2014). Jackson's (2017) study found apart from a few isolated examples, students remained in the phase of being reliant on external cues and modelling the actions of others, such as a supervisor. She highlighted the need to actively encourage students to be explicitly aware of the formation of the professional self and to reflectively consider tensions arising in identity development processes, since this may help students to catalyse more advanced levels of PPI development.

The correlation between promoting learners to self-regulate their actions in work placements and making progress in the phases of pre-professional identity have been pivotal in shaping the pedagogical pattern design we have created in the PlacementPAL project. We have looked to the construct of 'scaffolding' to promote self-regulation in work contexts, and assisting students to move forward in pre-professional identity formation.

We argue these issues and challenges around placements need to be more deeply scrutinised, to elicit a better understanding of student needs and to assist in designing relevant scaffolding in a pedagogical pattern, with the aim of promoting students' self-regulation and thereby, to influence more confident transition into work placements.

Self-regulated learning and developing a pre-professional identity

Research on self-regulation provides another lens when thinking about students' preparedness and confidence in beginning workplace learning. Self-regulated learning is characterised by the development and deployment of good learning strategies, a positive sense of self-efficacy and the learner engaging in pursuing meaningful goals. It can be seen in a learner's awareness of their own learning activity and being able to look over that activity, from time to time, to reflect on what's happening (Ritchie, 2016; Ellis & Goodyear, 2010; Zimmerman, 2002). An effective learner is able to take informed action, based on this reflection. A student's attention to self-monitoring and self-evaluation are important factors in self-regulated learning, such as by monitoring their actions and making necessary adjustments. It is this characteristic of effective learning we seek to promote among learners as they transition into workplace learning. We therefore need to look at ways to help scaffold the development of fluency for self-regulation in workplace contexts, especially when we know students commencing placements are likely to lack confidence, feel apprehensive and uncertain.

Pang (2015) ascertains in a study focusing on the placement experiences of trainee cooks, that students can more quickly establish their usefulness in work placements when they are able to initiate and self-manage their own activities. In Pang's study, initial observations by students, such as to understand routines,

What are the challenges in placements from the students' perspective?

Frequently HE students describe themselves to be unready, ill-equipped and lacking in confidence for work placements (e.g. Chee, 2016). Walker *et al* (2012) associated this lack of confidence to students' limited knowledge, when students have reported to *"…become aware of their lack of knowledge when they need to know it"* (Walker *et al*, 2012: 119). Students' confidence for workplace learning may be challenged by self-questioning whether they have the requisite behavioural capabilities and skills, such as for working with others. Maidment (2003) reported students can feel disconnected to their supervisors, finding it difficult to build a working relationship with them and lacking confidence in how to communicate appropriately with other colleagues, as well as with clients or patients. Eley (2010) found students felt apprehensive about their skills for teamwork, about learning the routines of placements, and worried they would lack the coping strategies for managing work in high demanding conditions.

Other studies found students' expectations about what they would be doing on placement to be rather vague (Harvey & Little, 2006) with students describing unexpected experiences and being given responsibilities that were not anticipated beforehand (Maidment, 2003; Pang, 2015; Walker *et al* 2012, Paliadelis & Wood, 2016). Meanwhile, Markauskaite and Goodyear (2017) considered preparation for professional education and suggest:

> *"Most of the things that students find hard to learn in their professions tend to be concentrated around four main challenges, …: linking theories with practice, developing professional skills and identity, designing professional artefacts for the future, and working with other professionals and clients"*
> (Markauskaite & Goodyear, 2017: 49)

these studies provide no specific guidance or detailed designs for resources, tools or aide-memoires to scaffold support for students commencing placements, nor how students might maximise placement experiences and workplace learning. This is an area we argue needs greater emphasis, guidance and specific support development, if employers and students alike are to gain from these potentially beneficial experiences.

Thus, despite increasing insights into the skills' range desired by employers, and the importance of developing demonstrable qualities from the outset, it is clear from existing research (Small *et al*, 2018; Wilton, 2012) that less is understood about the best means of imparting such skills and attributes in a way that promotes students' self-regulation and capacities for independent learning in the work context.

Additionally, it is acknowledged contemporary employers are looking to employ graduates that possess the relevant key or transferable skills and aptitudes, alongside subject-specific knowledge and skills e.g. good communication skills, teamworking and negotiation skills; self-management; the ability to cope with complexity and to be able take initiative(s). Indeed, increasingly a number of employers are placing more value on the key skills "*such as communication, analysis and ethics*" (Junek *et al*, 2009:121). These are all associated to self-regulated learning, as well as attributes of an autonomous and confident learner, and therefore any support information needs, it can be suggested, should be provided in a style, tone and format that can be accessed independently, flexibly and in a manner tailored to the specific tasks and requirements of the placement setting.

Accordingly, HE and FE providers are ideally placed to lead, working collaboratively with advice and guidance from students and employers, in the process of designing a tool to promote students' self-regulation and scaffold learning in work-place settings.

In the PlacementPAL project, we considered the kinds of information and resources that are provided to help students engage with the norms of the workplace and to perform the expectations made of them. Our own concerns around developing better provision for placements led to the pedagogical pattern that we discuss later in this paper. But first we review the broad challenges that have been identified around placements from employer and students' perspectives.

Employer perspectives on work placements

Employer perspectives on workplace learning tend to focus on identifying the skills and abilities expected in placement students, but often foregrounding those skills and abilities employers perceive students to lack. For example, Wilton (2012) reviewed the impact of work placements on graduates studying Business Management. The skills most graduates lacked according to employers were commercial awareness, team-working skills, interpersonal skills, problem-solving abilities and analytical thinking. Similarly, Small *et al*'s (2018) comprehensive review highlighted graduate recruiters require a variety of abilities, characteristics and attributes. They suggest employers are keen to see students with well-developed emotional intelligence, work experience and demonstrable leadership. Additionally, and more critically, employers want students who are able to market and further develop these qualities from the outset of their first encounters with work environments, such as in placements.

Employers are said to regard graduates with work experience elements to their degree in higher esteem, compared to those without such experience (Artess *et al*, 2017). However, despite this acknowledgement of the value of workplace learning from employers (Artess *et al*, 2017; Jackson & Wilton, 2017; Trehan & Pedler, 2010),

who have been on placement, to elicit their perceptions of specific resources or content needs to include in the pattern solution.

The pattern illustrates a systematic approach to pedagogical design of an applied, practice-based and student-oriented solution for scaffolding students' support when commencing work placements and workplace learning. It enables us to act on recognised and authentic issues associated with students' transition into placements and work contexts. The PlacementPAL solution has been applied to test its proof of concept, in trialling two web-based applications (webapps) used as flexible digital aide-memoires on students' smartphones or other digital devices while on placement in two distinctly different contexts of radiotherapy and oncology, and events and tourism management. Elsewhere, we report on the evaluation of these two pilot studies (for example, see Nolan & Doolan, 2018a; and 2018b).

However, in this paper, we focus on the elicitation of knowledge around authentic experiences of student placements that informed the pedagogical pattern, and which offer a contribution to understanding around promoting learners' self-regulation through scaffolding students' transition into work placements. Our premise is that while there is a body of literature around students' learning *from* undertaking placements, there is more limited evidence on what is needed to effectively prepare students *for* workplace learning and their placement experiences. This concern was also picked up by Bridge and Carmichael (2013), who conducted research around student readiness for clinical placements finding when students were given information about placements prior to commencing, students were more confident in what to expect, more familiarised with the setting and more prepared for the placement work.

Self-regulatory skills and abilities are important too for workplace learning and on work placements. Placements have become an integrated part of many UK students' higher or further education experience, providing opportunities for students to act more autonomously, applying theoretical knowledge and procedural skills gained during degree programmes in authentic, practice settings. Placements enable students to learn in and from the professional context, moving towards becoming part of the professional community and in developing their own pre-professional identities (Jackson, 2017).

However, we recognise moving from the relatively 'safe' environment of higher or further education programmes into professional work contexts can feel daunting for students and lead to anxiety. For example, placements are likely to require students to flex and adapt, particularly between theory and practice, such as in making adjustment between their (developing) understanding of theoretical knowledge and the "*contingent nature of professional work and ways of knowing adopted in professional communities and used in organising professional knowledge work*" (Markauskaite & Goodyear, 2017: 33).

Thus, the key question informing this research was: *What scaffolding, in aspects of support, might help students' self-regulation and transition into placement(s) and workplace learning?* In order to make headway with this question, we contribute to discussions on supporting students commencing work placements in this paper by: (1) examining extant perspectives on the challenges and support needs in relation to students' transition into work placements; (2) problematising notions of support and scaffolding in the use of support devices to facilitate learners' self-regulation in learning transitions; before (3) discussing the overarching pedagogical pattern; and finally (4) reviewing the experiences of two discrete groups of students

Introduction

This paper focuses on the design activity for a pedagogical pattern intended to help scaffold undergraduate degree students' self-regulation, as they transition into workplace learning or placements as part of their studies. The paper draws from research undertaken as part of the PlacementPAL project. PlacementPAL was part-funded by HEFCE (the UK's Higher Education Funding Council for England, now called the Office for Students), under an initiative promoting innovations in HE (university-based) teaching and learning. The project investigated ways to enhance students' effective and confident transition into work placements, by developing timely, innovative support via access to contemporary, digital forms of information resources, used to promote students' self-regulation in workplace learning. The 'PAL' element of the project title refers to Peer Assisted Learning, in that high value was placed in drawing directly from students' experiences and perceptions from undertaking placements, to assist in the context-specific design of relevant scaffolding and resources.

Students' self-regulation is recognised as an essential characteristic of good learning in higher and further education, that contributes towards the development of learner independence and autonomy. Self-regulation includes the learner actively monitoring their own actions, finding and using resources, setting goals, as well as evaluating and critically reflecting on achievements and development.

Scaffolding learners' self-regulation in workplace learning: design of a pedagogical pattern for placements

ABSTRACT

Work placements and workplace learning are increasingly integral components of undergraduate degrees, run within post-compulsory educational institutions; both in universities and further education colleges in the United Kingdom (UK). The intent in workplace learning is to help students attain the work-ready competencies (or employability) sought by graduate employers. By consequence, the UK's Higher Education (HE) and Further Education (FE) sectors are under pressure to identify and respond to students' needs during this important, but often challenging transition to workplace learning. Conceptual considerations around work placements, drawing from employer and students' perspectives on the challenges of placements are presented. This analysis contributes to discussions on students' preparation and transition into work contexts, focusing on promoting self-regulation, as part of developing students' capacities for this kind of independent learning and in building students' pre-professional identities. The design of an outline 'pedagogical pattern' for scaffolding transition into work placements is provided, as a systematic approach to scaffolding students during transition and to aid workplace learning. Significantly, the pattern articulates the contemporary challenges associated with student support and self-regulation in commencing workplace learning, while recommending a flexible web-based solution that is informed by authentic student perceptions of placement support needs.