Education + Training

Embedding sustainability in university work experience placements: A De Montfort University Model

SCHOLARONE™
Manuscripts

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Embedding sustainability in university work experience placements: A De Montfort University model

Abstract

Purpose: The paper looks at the feasibility of university placements supporting Small and Medium-scale Enterprises (SMEs) to operate in a sustainable manner. Due to size and resource constraints, many SMEs may regard sustainability more as a burden than a value-adding commercial strategy.

Design/methodology/approach: A two-year study was conducted on the sustainability-themed placements of 101 students of De Montfort University, United Kingdom, in SMEs. The placements were designed with the purpose of acting as a traditional work experience scheme while also equipping students with learning, skills and orientation with which to act as sustainability champions within companies. The study combined the use of students' reflections (via tools such as monthly logbooks) with interviews and questionnaire surveys of both employers and students, in order to evaluate the outcomes of the placements.

Findings: Students engaged with the sustainability aspect of their placements mainly by obtaining information on the sustainability performance of SMEs, with significant engagement also occurring in the areas of sustainability advocacy (e.g. proposing socio-environmental plans to companies) and initiatives/action.

Originality: A circular approach to university placement programmes is proposed whereby the knowledge gained from previous placements about SMEs' sustainability performance is used to prepare later cohorts of placement students with a pragmatic understanding of challenges and opportunities related to the implementation of sustainability by SMEs.

Practical implications: Placements can potentially serve as a means of knowledge generation for universities while providing SMEs with cost-effective staff and innovation sustainability resources.

Keywords

Sustainability, placements, SMEs, observation, action, advocacy

Article classification

Research paper

Introduction

The role of universities in society is ever-evolving, with universities continuously adapting their services in a world where access to knowledge has been pluralised by advances in information technology in particular (Hewitt-Dundas, 2012). The issue of sustainability in particular is one in which universities are seeking to contribute both within the traditional academic domain and in industry practice. The definition of sustainability, or being sustainable, adopted for this paper is the conducting of human activity – domestic, commercial, industrial and other forms – in a way that safeguards the ability of the earth's ecology and resources to ensure decent living standards on an indefinite basis (Badiru and Agustiady, 2021; Zhang *et al.*, 2020; Zinkin, 2020). Universities are involved in the design and development of tools and systems that can facilitate the production and consumption of goods and services in a sustainable manner. A critical factor in the success of these efforts is, naturally, the adoption and maintenance of these tools and systems by manufacturing and service companies, as they are a very significant contributor to adverse environmental and social impacts (Geissdoerfer *et al.*, 2017). Small and Medium-scale Enterprises (SMEs) in particular form a major proportion of businesses (Bouwman *et al.*, 2019; Falahat *et al.*, 2020); in the United Kingdom (UK) they account for over 99% of all private firms and nearly 60% of private sector employment (BEIS, 2019). SMEs are described by the UK's erstwhile Department for Business, Innovation and Skills (BIS, 2010) as enterprises that employ fewer than 250 persons and have an annual turnover not exceeding €50 million, and/or an annual balance sheet total not exceeding €43 million. Many SMEs have significant resource and size limitations, and thus have to rely on business models that focus mainly on financial survival, with the objectives of cost and risk reduction dominating decision-making (Araujo *et al.*, 2022; Hsu *et al.*, 2017; Isaksson *et al.*, 2010). Under these circumstances, socio-environmental responsibility could be viewed by SMEs as not contributing to competitive advantage, as environmental costs are not readily transferrable from the company to the customer without raising product prices (Carroll and Buchholtz, 2012; Kiron *et al.*, 2014). Regulatory intervention by government, rather than voluntary internal action, is often the main/sole driver of SMEs' environmental decisions (Beamon, 2008; Shields and Shelleman, 2015).

This paper explores the topic of a university's placements as a bottom-up approach to supporting the implementation of sustainability in SMEs. The university in question is De Montfort University (DMU) in Leicester, United Kingdom. Placement refers to a period during which a student works in industry as part of their learning, with the work typically related to the student's course to a very significant degree.

Literature review

University intervention and sustainability in SMEs

As the world has become faster-paced, and as knowledge has become more ubiquitous – its flow and exchange made more fluid by information and communications technology – universities are having to reposition themselves in society by establishing greater synergy between its classical roles of education and knowledge generation on the one hand, and wider socio-economic development on the other (Cheng *et al.*, 2016). There is an ever-growing expectation that the knowledge-based operations of universities translate readily to value to society in more tangible, less abstract terms, including the lending of competitive advantage to businesses (Smith *et al.*, 2010).

The area of sustainability is one in which universities can make pragmatic contributions towards meeting modern societal and business needs. Since the previous century, longstanding classical business and production models have necessarily been creeping away from a wholly economic

perspective to one that acknowledges the need to minimise the socioenvironmental impacts of commercial activity (Badiru and Agustiady, 2021; Mendonca *et al.*, 2010; Stanfield and Carroll, 2009). However, due to resource and size limitations, the pressing priority of many SMEs in particular is financial survival (Shkolnykova and Kudic, 2021; Xu and Li, 2019), with socio-environmental responsibility not viewed as a value-adding philosophy, and hence not actively integrated into companies' operations (Shields and Shelleman, 2015). A sustainable mode of operation requires firms to internalise environmental and social costs rather than pass them outwards in the form of environmental degradation, worker abuse, toxic products and other negative impacts (Everett *et al.*, 2021; Carroll and Buchholtz, 2012). As this approach can raise the intensiveness of facility and material specifications, raise quality management levels, and reduce supply chain flexibility, there could be an increase in a company's operational costs, and an attendant increase in product prices, which can lower a SME's market competitiveness (Jaffe *et al.*, 2005). This results in many SMEs adopting a risk-averse stance to deep sustainable practices even where these hold latent economic and competitive advantages (Beamon, 2008; Darcy *et al.*, 2014).

Multiple recent academic and industry studies have attempted to address this situation, with various sustainability tools and systems, such as bespoke balanced scorecard approaches, proposed for adoption by SMEs (Hsu *et al.*, 2017; Williams and Schaefer, 2013). However, SMEs often regard these tools and systems as leaning more towards the abstract than the practical (Cosh and Hughes, 2010). Based on previous research (Hart and Milstein, 2003; Hilary, 2004; Sinclair, 2012; Worthington and Patton, 2005), this tendency can be lessened by emphasising the role that a SME's existing conventional, economic-led processes can actually play in reducing its environmental and social impacts, rather than mainly relying on ethics-based arguments. Suh and Lee (2018), for instance, draw attention to the understated role that agile business practices, such as modular design, can play in enhancing a manufacturing SME's socioenvironmental performance. In this manner, sustainability is presented less as an extreme transformation, with the attendant investment and change management connotations. It is instead presented more as an identification and sharpening of what the company may already be, wittingly or unwittingly, doing right, and using this as a platform to facilitate further transition. This approach should be combined with linking sustainability to a clear business case by highlighting the commercial benefits of environmental and social practices, such as energy and resource efficiency (Penty, 2020; Nidumolu *et al.*, 2009). By including opportunities and benefits alongside reforms in a single practical framework, SMEs may become less likely to perceive sustainability as an ethical burden rigidly connected to regulations, added cost and liability, and more likely to look at the issue as inherent to business strategy.

Placements as a means of intervention and learning

University placements, which are a prominent form of supervised work-based learning, represent a useful way for students to gain early career experience and make connections between academic theory and industry practice (McBride *et al.*, 2020; Whelan and Reichelt-Brushett, 2019). Companies can also use placements as a means of accessing relatively low-cost, mobile and motivated staff on a routine basis, and of complementing their long-term recruitment strategies (Elijido-Ten and Kloot, 2015). While some placements have a steep learning curve attached which may require significant training time commitments from the organisation, the perception of placements among SME and non-SME employers alike is generally favourable (Elijido-Ten and Kloot, 2015).

As indicated earlier in this literature review, many SMEs tend not to regard university activities as very relevant to their operations, with limited use of universities as a direct source of knowledge (Gibb, 2009). Placements fare better in this regard, although there remains a significant degree of skepticism

among SME owner-managers about the level of preparedness of graduates for the world of work (Cheng *et al*., 2016).

Within many universities themselves, placements are still traditionally viewed as being more of an add-on to taught learning than a deeply integrated component which can play a greater role in pedagogy/curriculum development as well as industry research (Rowe and Zegwaard, 2017). In a similar vein, while sustainability is being included more and more in university curricula, it is, to a significant extent, still treated like a separate discipline all on its own, or as an obligatory add-on to other courses, rather than as a key mainstream feature across university learning programmes (Burns, 2013; Djordjevic and Cotton, 2011; Filho *et al*., 2018). The latter, more holistic approach requires experiential learning systems, such as placements, in order to optimally facilitate deep learning in students and equip them with active, critical skills with which to drive transitions towards sustainability (Svanstrom *et al*., 2008; Wyness and Sterling, 2015). However, the effectiveness of such deep learning efforts is not always easy to evaluate (Smith and Hodge, 2019; Wiek *et al*., 2011). The most cogent propositions noted in previous studies to address this are that, firstly, the students' own reflection on their learning experiences should form the basis of any assessment (Armstrong *et al*. 2016; Gulwadi, 2009), and secondly, emphasis should be placed not only on technical knowledge and attributes gained by students, but also on interpersonal values and behaviours (Lourdel *et al*., 2007; Martin *et al.*, 2019; Segalàs *et al*., 2008). Conway (1994) defines reflection as 'the process of looking back on what has been done and pondering on it and learning lessons from what did or did not work... The act of deliberation, when the practitioner consciously stops and thinks: what shall I do now'. It can be deduced from these and other notable literature sources (Gibbs, 1988; Hatton and Smith, 1995; Kolb, 1984) that students would need to make connections between what they already know and what they are experiencing in their placements, identify the significance of situations and actions from a variety of perspectives, provide supporting evidence for their reflection, identify changes in viewpoint over time, and possibly design a plan for putting their reflection into action.

Robust research by Armstrong *et al*. (2016) and Sipos *et al*. (2008) indicates that as a prerequisite for sustainability-focused experiential learning via placements, students should, even if only at a basic level, be able to combine socio-technical systems and economic thinking with literacy in the mechanics of environmental and social concepts such as energy management, resource efficiency, and social responsibility. In addition, Armstrong *et al*. (2016) and Selby (2009) appear to stress the need for a pragmatist philosophy to underpin the experiential learning process. These measures would serve to mitigate a situation in which students go into placements with an overly ideological or zealotic mindset towards the implementation of sustainability in industry, and would provide students with a starting awareness of economic, regulatory, societal and technological factors affecting sustainability.

Some literature sources (Burns, 2013; Svanstrom *et al*., 2008; Wiek *et al*., 2011) also allude to the topic of sustainability being not only technical, but having significant ethical and personal connotations as well. It is thus safe to infer that the personal commitment of students towards environmental protection and social stewardship would play a major role in the achievement of intended sustainability outcomes of a placement. To this end, it can be posited that the sustainability aspect of placements should be a voluntary/optional one, with students provided with fundamental learning about sustainability and socio-technical systems thinking at an earlier stage, and then deciding whether or not to include sustainability as a component of their placement.

Methodology

The research relies on a pragmatist philosophy, as the actions and perceptions of the participants were studied and interpreted with a view to evaluating their practical relevance to the research question:

to what extent can placements support SMEs to operate more sustainably? The philosophy of pragmatism is regarded by various authors (e.g., Haas and Haas, 2002; Powell, 2003) as being both epistemological and ontological, describing what humans do and using the knowledge as a justifiable basis for further human action, which is what lends knowledge its highest significance (Morgan, 2007; Rescher, 2005).

Year-long sustainability-themed SME placements were implemented at the Faculty of Computing, Engineering and Media (CEM) at De Montfort University (DMU) over two years (June 2019 - May 2020 and June 2020 - May 2021). A total of 101 undergraduate and postgraduate (Masters) students were involved across both placement years (52 in 2019/20 and 49 in 2020/21). The students were enrolled in a range of STEM-linked courses such as cybersecurity, mechanical engineering, and digital technology. They were placed across a total of 73 companies. Both placement years are broken down to three durational stages below: pre, intra and post.

Pre-placement

In the three months prior to the commencement of each placement year, students attended two workshops that provided an orientation on both sustainability and critical reflection. One-to-one tutoring sessions were also made available to students who wanted guidance and support on sustainability and reflection beyond the workshops and any learning already gained from their respective courses. Regarding sustainability, students were provided with both 'abstract' and 'pragmatic' learning. The abstract component focused on the theoretical concept of sustainability, allied principles such as the United Nation's Sustainable Development Goals (SDGs), and the relation of these topics to both industry and education. The pragmatic component focused on identifying overlaps between traditional, economic-led business processes on the one hand and environmental and social practices on the other. The learning sessions established how the traditional and socio-environmental aspects can complement each other using agile approaches (such as flexible capacity utilisation). The sessions also looked at challenges (e.g. costs) and opportunities (e.g. in the area of public-private collaboration) alike that lay in achieving this synergy.

Students were asked to perform a self-evaluation of skills relevant to the upcoming placement. They assessed themselves in seven areas: teamworking, communication, organisation, problem solving, self-management, technical skills (related to sustainability know-how as well as technology and other work-based tools), and analysis (numerical and qualitative). Communication was further broken down to three sub-areas: verbal, written and graphical, and reading and viewing (of written and graphical content produced by others), while analysis was broken down into basic and advanced. The assessment was a combination of quantitative and qualitative indices (a rating scale of 'Low', 'Medium' and 'High' combined with a comment box).

Students were also asked to set starting development goals (not to be confused with SDGs) regarding the skills, knowledge, and/or character attributes that they expected to gain or improve during their placements, as well as any products and/or processes that they expected to help create, maintain or enhance. The setting of development goals involved addressing the following questions: 'What do I plan to develop?', 'How do I plan to do this?', 'How will I know that I have got there?', and 'What is the target date for review/completion?'. The average number of goals set per student at the start of their placement (as well as later on in months 4 and 8) was 4. The development goals were subsequently evaluated via thematic analysis based on the following three degrees of students' engagement with sustainability: observation, advocacy, and action. Observation here refers to the student investigating the company's environmental and social performance without actively trying to influence it, except as part of the student's official duties. Advocacy refers to the student promoting

awareness, contributing towards proposals/plans, and/or conducting research or learning about how a company can achieve socio-environmental outputs. Action refers to the student being directly involved in the implementation of sustainability measures and initiatives.

Intra-placement

During their placements, students produced reflective logbook entries on a monthly basis which focused on their placement experiences, including on the sustainability performance of their respective placement organisations. The reflective logbook entries captured student and employer perspectives about the activities the students were involved in, what went well and what did not, the students' particular contributions, competencies developed (in terms of skills, knowledge, character traits, and overall experience), and how things could have been done differently. In addition, in the final month of each placement year students produced a reflective report that provided an overall balanced critique of the students' activities and exposure to industry during their placement year, including in the area of sustainability. To maximise the validity of the information generated through the logbooks and final reports, the authenticity of both source materials was doublechecked consistently by the university through interaction with the students' line managers and/or other relevant company staff, including company visits.

The students and their employers (represented by the students' supervisors/managers at the placement companies) responded to two rounds of questionnaires and interviews for the purpose of providing their separate perspectives on the students' ongoing experiences with sustainability within the company, and the progress of the placement in general. The first round of questionnaires and interviews took place within the third to sixth months of the placement, while the second occurred within the sixth to ninth months. In each round, the questionnaires preceded the interviews and were structured differently for the student and their supervisor/manager. The student was asked to rate the following on a six-point scale: the quality of their tasks/activities; the relevance of their work to their course of study; the relevance of their work to their future career interests; the companies' expectations of them; and how well they think they are meeting the companies' expectations.

The supervisor/manager was asked to rate the student's performance in the following areas on a four-point scale (the ratings being, in descending order, 'Exceeds expectations', 'Meets expectations', 'Potential for improvement', and 'Unacceptable performance'): planning/organising, communication, teamworking, problem solving, analysis, technical skills, organisation-specific skills (such as the student's understanding of the company's products/services and commercial situation), and self-improvement. Upon completion of the questionnaires in each round, the student and supervisor/manager were interviewed to gain in-depth information on the quality of support given to the student, the extent to which the student is gaining and applying skills/knowledge/behavioural traits, the extent of the student's engagement with internal and/or external company stakeholders, and the impact of the placement on the company's sustainability performance.

Around the middle of each placement year, students attended online refresher workshops on reflection and sustainability. Students also revised their development goals – by setting new ones or carrying over earlier ones – at the start of the fourth month of their placements, and again at the start of the eighth month.

Post-placement

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

At the end of each placement year, students' reflective logs and reports were analysed using thematic analysis. The findings were cross-referenced with the results of student and employer questionnaires and interviews, students' initial skills assessments, and the progress of their development goals, in order to provide a holistic picture regarding the sustainability outcomes of the students' placement roles, and correlations between the students' development and the sustainability outcomes.

Findings

Pre-placement

Initial skills assessment: The rating most commonly selected by students across all the categories and sub-categories being self-assessed was 'Medium'. On average, each student selected 'Low' 0.6 time out of the 10 possible categories and sub-categories, 'Medium' was selected 5.2 times, 'High' was picked 3.9 times, and no rating was picked 0.3 time. Students generally rated themselves lower on technical skills and analysis, as the three categories and sub-categories concerned had the highest number of 'Low' ratings - 8 in all 3 cases, compared to the mean number of 'Low' ratings for each category/sub-category, which was 5.6. Students were more optimistic about interpersonal/non-technical/general skills, with Reading and Viewing having the highest number of 'High' ratings (59) overall, and the problem-solving category having the second highest (42). They felt capable of dealing with issues in work and personal life alike, with qualitative comments about problem-solving including the following:

"In normal daily life, I can often problem-solve relatively well knowing which problems I need to fix first before focusing on other areas".

"Practiced whenever applicable through previous university, home and job life but would like to continually expand my experience in this regard".

"I am quite good at assessing situations, identifying problems and prioritising urgency".

Development goals: 84 students set development goals at the start of their respective placements. An evaluation of the goals indicates that the majority of students – 70 (83.3%) – were predominantly oriented towards observation. A sample of an observation-oriented goal at the start of the placement is provided below.

Table I: Example of a development goal

Intra-placement

Questionnaires: The employers' assessment of students' performance was largely positive, with 'Meets overall expectations' being the most selected rating in both rounds (at 76.5%). Likewise, the students' assessment of their experiences was largely positive, with the highest possible rating selected the most in both rounds for the quality of students' tasks/activities (79.3%), the relevance of their work to their course of study (65.5%), and the relevance of their work to their future career interests (81%). While many students felt that their companies' expectations of them were above average (the second and third highest ratings were each selected by 44% of students, totalling 88%,

across both questionnaire rounds), they also felt that they were meeting those expectations well (the second highest rating was the most selected for this question at 66.8%).

Interviews: A total of 364 responses were obtained across the two interview rounds (90 students and 95 employers responded in the first round, while 98 students and 81 employers responded in the second). As with the questionnaires, employers and students both had mainly favourable views about the value being provided by the student to the company, and the development being gained by the student in the process. Some comments in both rounds of interviews are cited below:

"Working around the shipping industry and environment has been very interesting and I would enjoy working in this sector in the future" – student

"He has contributed significantly to the business and is a key member of our technology team. He has also made a good effort to get to know everyone in the business and is well liked" – employer

"The tasks I complete aren't always closely tied with my course but they allow me to develop skills not covered by course material. I think this is good as it makes me stand out from other candidates in my field" – student

"(Student's name withheld) has been a great resource and has been helpful in helping us to develop & grow at our early stage" – employer

However, in the first round of interviews, the evaluation of students' interpersonal skills by many employers, and by students themselves, was more modest than students' self-evaluation at the pre-placement stage. When discussing areas for potential improvement in a student's performance, employers and students talked more about interpersonal areas, such as communication and confidence, than technical skills and knowledge. Some excerpts related to this are provided below:

"Needs a little work on taking constructive criticism, and how to adapt to changing business situations" – employer

"I've learnt that public speaking or speaking up and putting my opinions forward is not my strong suit. Whilst I have opinions about things, I cannot naturally articulate them well, especially if there are more than a handful of people on the meeting" – student

"Room for improvement in communication, interpersonal ability, leadership skills" – employer

"I believe I need to be more confident in making decisions for myself" – student

This situation was less readily apparent during the second round of interviews, with no aspect of students' development receiving particularly high approval or concern.

Development goals: A total of 67 students set new development goals, or carried over existing ones, by month 4 of the placement years. An evaluation of the goals indicates that the majority of students were still predominantly oriented towards observation at this stage, 47 in total (70.2%). This situation remained the same at month 8, with a total of 59 students updating their goals and 40 of them (67.8%) mainly having observation intentions. Excerpts from students' goals are shown below.

Table II: Excerpts of development goals set in months 4 and 8 of the placement years

Post-placement

Monthly logbook: A total of 715 logbook entries were produced by 95 students. Thematic analysis of the entries (Figure 2) indicated that 37 students (39%) focused mainly on observation across the

months of their placements, compared with 16 (16.8%) for action and 5 (5.3%) for advocacy. In addition, 11 students (11.6%) were found to have a dual focus on advocacy and action, 6 (6.3%) on observation and advocacy, and 4 (4.2%) on observation and action. The focus of a further 16 students (16.8%) was found to be completely mixed. Samples of log book statements are given below for the various themes:

"There are a few good examples of this (green practices) on site - the first being the canteen on site uses biodegradable boxes, another being the idea that eventually the bus to get onto site (sic) will be replaced with an electric version, and the final one being the huge building project on site, which has seen the carpark have multiple huge solar panel coverings on it" (observation)

"I am creating a technical procedure (to improve materials/resource efficiency) for semi-finishing process (an aspect of precision manufacturing) referring to previous route cards and procedures" (action)

"I learnt how we can conserve energy, reduce wastes and reduce consumption of water in workplace (sic)" (advocacy)

Final reflective report: 98 final reflective reports were produced which provided summative information that complemented the logbook entries. Thematic analysis of the reports (Figure 3) indicated that 28 students (28.6%) focused mainly on observation during their placement, 15 (15.3%) focused mainly on advocacy, and 11 (11.2%) on action. 25 students (25.5%) appeared to have a mixed focus, while the remaining 19 reports (19.4%) provided insufficient or no detail on sustainability. Some report excerpts related to students' engagement with sustainability are given below:

"More accurately, SDG… 11, 12 and 13 as (the placement company) has a tree-planting programme where they donate £50 for every house they build – at the same time, motivating children to engage with nature" (observation)

"Throughout my placement year I have worked in business areas… while also putting in additional time to work on side projects such as environmental projects" (action)

"Throughout the year I have completed multiple other (sic) presentations covering a multitude of topics such as… discrimination around sexual orientation" (advocacy)

Discussion

At the start of their placements, students had more confidence in their interpersonal skills than in technical and analytical ones, as indicated by the results of the initial skills assessment. This optimism had become tempered by the three to six-month mark, as responses from employers and students during the first round of interviews indicated that room for students' improvement lay mainly in interpersonal areas than in technical and analytical ones. This does not necessarily suggest overconfidence on the part of students at the start of their placements, however; students showed modesty when setting development goals, with over 80% choosing to start off on the observation route rather than embarking on advocacy or action straightaway. A more feasible interpretation is that the significance and application of interpersonal skills is considerably understated within a Higher Education environment, with tests and examinations mainly assessing students' academic abilities as opposed to their interpersonal growth. Under such conditions, students are more likely to place more emphasis on technical aspects of their development, and to view interpersonal skills as being secondary to technical and analytical skills (Martin *et al.*, 2019; Segalàs *et al.*, 2008). This could then translate to students being more cautious when self-evaluating technical and analytical skills than when doing the same for interpersonal skills. While this paper is not stating that universities should

double as bastions of interpersonal grooming – other societal institutions and organisations, such as family and the life coaching industry, are available for this – there is scope for students to be made more aware of the relevance of interpersonal skills and its implications for their future career and general life. This would contribute towards better preparing students for employment and the wider world. This position is supported by earlier research publications that stress the need for greater emphasis on soft skills development (Berdanier, 2022; Burns, 2013; Lourdel *et al.*, 2007).

The students' role as sustainability champions was viewed favourably by employers and students, which is certainly a positive thing. But what was the actual impact of the role? Much of the role's outcomes lay in the observation of SMEs' environmental and social performance, as evidenced by the students' logbook entries and final reflective reports. While advocacy provides feedback and awareness to SMEs regarding the extent of their social and environmental impacts and how they can be more socio-environmentally responsible, and action directly contributes to efforts by SMEs to minimise their social and environmental footprints, observation does not really yield any sustainability information or activity for the companies themselves. Instead, it provides information on sustainability in industry to a different placement stakeholder, the university, which can complement a university's standard research activities. The process of compiling log books and reports, when supported by placement tutors with a good research background, can serve as a useful data collection activity.

To make the observation outcomes more relevant to SMEs, a circular approach to student placements would be required. The placement arrangement should be conceived as a four-stage cyclical process that extends beyond the completion of the students' work contracts (Figure I). Upon students completing observation and rounding up their placements, the information obtained via observation should be used by the university to prepare the sustainability workshop sessions for the next placement year, and it should also be integrated into taught course modules as much as possible. This would further deepen the pragmatic aspects of the sustainability learning provided to students before they go out on placement, enabling them to have a better starting understanding of realities surrounding the long-term implementation of socio-environmental responsibility by SMEs.

Figure I: A proposed circular approach to running sustainability-themed placements

Conclusion, limitations and recommendations

This paper explored the feasibility of using university placements as a means of supporting SMEs in the aspect of sustainability. Over a period of two years, students from De Montfort University undertook placements at SMEs, during which they performed the role of sustainability champion alongside their regular work duties, utilising learning and orientation provided by the university before and during their placements. While this arrangement delivered some impacts in the areas of advocacy and action, much of the outcomes lay in the area of observation. The paper posits that in order for the observation outcomes to influence the future sustainability performance of SMEs, the placement system should be structured as a constant feedback loop in which sustainability information gained from previous observation is used to prepare later cohorts of placement students with pragmatic insight into the extent to which SMEs are willing and able to practice environmental protection and social accountability. This would make the students better equipped to conceptualise grounded sustainability solutions for SMEs.

While the students who participated in the placements covered by this article were made up of both undergraduates and postgraduates, the article does not go into detail regarding any differences

between undergraduate and postgraduate placement outcomes, as the number of postgraduate students is too low (19 out of 101) to present a significant sample size. In addition, the students involved in this study came from a limited number of academic domains and are not representative of all Higher Education disciplines.

There is scope to conduct a comparative analysis of undergraduate and postgraduate placement outcomes in future. Future research on sustainability-themed placements by this author will also cover a longer time span (five to seven years) in order to evaluate how the circular approach proposed in this paper could influence the impacts of the placements on SMEs over time.

References

Araujo, M., Arranz, T., Baena, R., Figueroa, P., Hervada, J., and Irissarry, B. (2022), *Specialisation Agreements and SMEs: Final Report*, Publications Office of the European Union, Luxembourg.

Armstrong, C., Hustvedt, G., LeHew, M., Anderson, B., and Connell, K. (2016), "When the informal is the formal, the implicit is the explicit: holistic sustainability education at Green Mountain College", *International Journal of Sustainability in Higher Education*, Vol. 17 No. 6, pp.756-775. https://doi.org/10.1108/ijshe-02-2015-0012

Badiru, A. and Agustiady, T. (2021), *Sustainability: a Systems Engineering Approach to the Global Grand Challenge*, Taylor and Francis, Boca Raton.

Beamon, B. (2008), "Sustainability and the future of supply chain management", *Operations and Supply Chain Management,* Vol. 1 No. 1, pp.4-18.

Berdanier, C. (2022), "A hard stop to the term 'soft skills'", *Journal of Engineering Education*, Vol. 11 No. 1, pp.14-18. https://doi.org/10.1002/jee.20442

Bouwman, H., Nikou, S., and de Reuver, M. (2019), "*Digitalization, business models, and SMEs: how do business model innovation practices improve performance of digitalizing SMEs?*", *Telecommunications Policy*, Vol. 43 No. 9. https://doi.org/10.1016/j.telpol.2019.101828

Burns, H. (2013), "Meaningful sustainability learning: a study of sustainability pedagogy in two university courses", *International Journal of Teaching and Learning in Higher Education*, Vol. 25 No. 2, pp.166-175.

Carroll, R. and Buchholtz, A. (2012), *Business and Society: Ethics, Sustainability and Stakeholder Management*, Cengage Learning, Ohio.

Cheng, R., Lourenco, F., and Resnick, S. (2016), "Educating graduates for marketing in SMEs: an update for the traditional marketing curriculum", *Journal of Small Business and Enterprise Development*, Vol. 23 No. 2, pp.495-513. https://doi.org/10.1108/jsbed-09-2014-0153

Conway, J. (1994), "Reflection, the art and science of nursing and the theory-practice gap", *British Journal of Nursing*, Vol. 3 No.1, pp.77-80.

Cosh, A. and Hughes, A. (2010), "Never mind the quality, feel the width: university-industry links and government financial support for innovation in small high-technology businesses in the UK and the USA", *Journal of Technology Transfer*, Vol. 35 No. 1, pp.66-91.

Dada, O. and Fogg, H. (2014), "Organizational learning, entrepreneurial orientation, and the role of university engagement in SMEs", *International Small Business Journal*, Vol. 34 No. 1, pp.86-104. https://doi.org/10.1177/0266242614542852

Darcy, C., Hill, J., McCabe, T., and McGovern, P. (2014), "A consideration of organisational sustainability in the SME context: a resource-based view and composite model", *European Journal of Training and Development*, Vol. 38 No. 5, pp.398-414. https://doi.org/10.1108/ejtd-10-2013-0108

Department for Business, Energy and Industrial Strategy (2019), *BEIS Small and Medium Enterprises (SME) Action Plan*, BEIS, London.

Department for Business, Innovation and Skills (2010), *SME Statistics for the UK and Regions 2009*, BIS, Sheffield.

Djordjevic, A. and Cotton, D. (2011), "Communicating the sustainability message in higher education institutions", *International Journal of Sustainability in Higher Education*, Vol. 12 No. 4, pp.381-394.

Elijido-Ten, E. and Kloot, L. (2015), "Experiential learning in accounting work-integrated learning: a three-way partnership", *Education + Training*, Vol. 57 No. 2, pp.204-218. https://doi.org/10.1108/et-10-2013-0122

Everett, B., Warren, J., and Peake, S. (2021), *Energy Systems and Sustainability: Power for a Sustainable Future*, 3rd edition, Oxford University Press, Oxford.

Falahat, M., Ramayah, T., Soto-Acosta, P., Lee, Y. (2020), "SMEs internationalization: the role of product innovation, market intelligence, pricing and marketing communication capabilities as drivers of SMEs' international performance**,** *Technological Forecasting and Social Change*, Vol. 152. https://doi.org/10.1016/j.techfore.2020.119908

Filho, W., Raath, S., Lazzarini, B., Vargas, V., Souza, L., Anholon, R., Quelhas, O., Haddad, R., Klavins, M., and Orlovic, V. (2018), "The role of transformation in learning and education for sustainability", *Journal of Cleaner Production*, Vol. 199, pp.286-295.

Geissdoerfer, M., Savaget, P., Bocken, N., and Hultink, E. (2017), "The circular economy – a new sustainability paradigm?", *Journal of Cleaner Production*, Vol. 143 No. 1, pp.757-768. https://doi.org/10.1016/j.jclepro.2016.12.048

Gibb, A. (2009), "Meeting the development needs of owner-managed small enterprise: a discussion of the centrality of action learning", *Action Learning: Research and Practice*, Vol. 6 No. 3, pp.209-227.

Gibbs, G. (1988). *Learning by Doing: A Guide to Teaching and Learning Methods*, Further Education Unit, Oxford.

Gulwadi, G. (2009), "Using reflective journals in a sustainable design studio", *International Journal of Sustainability in Higher Education*, Vol. 10 No. 2, pp.96-106.

Haas, E. and Haas, P. (2002), "Pragmatic constructivism and the study of international institutions", *Millennium*, Vol. 31 No. 3, pp.573-601.

Hart, S. and Milstein, M. (2003). "Creating sustainable value", *Academy of Management Perspectives*, Vol. 17 No. 2, pp.56-67.

Hatton, N. and Smith, D. (1995), "Reflection in teacher education: towards definition and implementation", *Teaching and Teacher Education*, Vol. 11 No. 1, pp.33-49. https://doi.org/10.1016/0742-051x(94)00012-u

Hewitt-Dundas, N. (2012), "Research intensity and knowledge transfer activity in UK universities", *Research Policy*, Vol. 41 No. 2, pp.262-275.

Hilary, R. (2004), "Environmental management systems and the smaller enterprise", *Journal of Cleaner Production*, Vol. 12 No. 6, pp.561-569.

Hsu, C., Chang, A., and Luo, W. (2017), "Identifying key performance factors for sustainability development of SMEs – integrating QFD and fuzzy MADM methods", *Journal of Cleaner Production*, Vol. 161 No. 1, pp.629-645. https://doi.org/10.1016/j.jclepro.2017.05.063

Isaksson, R., Johansson, P., and Fischer, K. (2010), "Detecting supply chain innovation potential for sustainable development", *Journal of Business Ethics*, Vol. 97 No. 3, pp.425-442.

Jaffe, A., Newell, R., and Stavins, R. (2005), "A tale of two market failures: technology and environmental policy", *Ecological Economics*, Vol. 54 No. 2-3, pp.164-174.

Kiron, D., Kruschwitz, N., Rubel, H., Reeves, M., and Fuisz-Kehrbach, S. (2014), "Sustainability's next frontier: walking the talk on the sustainability issues that matter most", *MIT Sloan Management Review*, Vol. 55 No. 2, pp.3-26.

Kolb, D. (1984), *Experiential Learning: Experience as the Source of Learning and Development*, Prentice-Hall, New Jersey.

Lourdel, N., Gondran, N., Laforest, V., Debray, B., and Brodhag, C. (2007), "Sustainable development cognitive map: a new method of evaluating student understanding", *International Journal of Sustainability in Higher Education*, Vol. 8 No. 2, pp.170-182.

Martin, A., Rees, M., Fleming, J., Zegwaard, K., and Vaughan, K. (2019), "Work-integrated learning gone full circle: how prior work placement experiences influenced workplace supervisors", *International Journal of Work-integrated Learning*, Vol. 20 No. 3, pp.229-242.

McBride, L., Fitzgerald, C., Costello, C., and Perkins, K. (2020), "Allied health pre-entry student clinical placement capacity: can it be sustained?", *Australian Health Review*, Vol. 44 No. 1, pp.39-46. https://doi.org/10.1071/ah18088

Mendonca, M., Jacobs, D., and Sovacool, B. (2010), *Powering the Green Economy: The Feed-in Tariff Handbook*, Earthscan Publishing, London.

Morgan, D. (2007), "Paradigms lost and pragmatism regained: methodological implications of combining qualitative and quantitative methods", *Journal of Mixed Methods Research*, Vol. 1 No. 1, pp.48-76.

Nidumolu, R., Prahalad, C., and Rangaswami, M. (2009), "Why sustainability is now the key driver of innovation", *Harvard Business Review*, Vol. 87 No.9, pp.56-64.

Penty, J. (2020), *Product Design and Sustainability: Strategies, Tools, and Practice*, Routledge, Abingdon.

Powell, T. (2003), "Strategy without ontology", *Strategic Management Journal*, Vol. 24 No. 3, pp.285-291.

Rescher, N. (2005), *Realism and Pragmatic Epistemology*, University of Pittsburgh Press, Pittsburgh.

Rowe, A. and Zegwaard, K. (2017), "Developing graduate employability skills and attributes: curriculum enhancement through work-integrated learning", *Asia-Pacific Journal of Cooperative Education*, Vol. 18 No. 2, pp.87-99.

Segalàs, J., Ferrer-Balas, D., and Mulder, K. (2008), "Conceptual maps: measuring learning processes of engineering students concerning sustainable development", *European Journal of Engineering Education*, Vol. 33 No. 3, pp.297-306.

Selby, D. (2009), "Towards the sustainability university: the Centre for Sustainable Futures, University of Plymouth", *Journal of Education for Sustainable Development*, Vol. 3 No. 1, pp.103-106.

Shields, J. and Shelleman, J. (2015), "Integrating sustainability into SME strategy", *Journal of Small Business Strategy*, Vol. 25 No. 2, pp.59-78.

Shkolnykova, M. and Kudic, M. (2021), "Who benefits from SMEs' radical innovations? – empirical evidence from German biotechnology", *Small Business Economics*, Vol. 58 No. 2, pp. 1157-1185. https://doi.org/10.1007/s11187-021-00464-x

Sinclair, S. (2012), "Educating for sustainability: Australian green skills initiatives and employment services", Allain, J. (Ed), *Skills Development Pathways in Asia*, OECD Publications, Paris, pp.189-190.

Sipos, Y., Battisi, B., and Grimm, K. (2008), "Achieving transformative sustainability learning: engaging head, hands and heart", *International Journal of Sustainability in Higher Education*, Vol. 9 No. 1, pp.68-86.

Smith, R. and Hodge, S. (2019), "Understanding innovation through the vocational student work-placement experience", *Journal of Workplace Learning*, Vol. 31 No. 7, pp.409-429. https://doi.org/10.1108/jwl-01-2019-0012

Smith, S., Rose, M., and Hamilton, E. (2010), "The story of a university knowledge exchange actor-network told through the sociology of translation: a case study", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 16 No. 6, pp.502–516.

Stanfield, J. and Carroll, M. (2009), "The social economics of neoliberal globalization", *Forum for Social Economics*, Vol. 38 No. 1, pp.1-18.

Suh, C., & Lee, I. (2018), "An empirical study on the manufacturing firm's strategic choice for sustainability in SMEs", *Sustainability*, Vol. 10 No. 2, pp.1-23. https://doi.org/10.3390/su10020572

Svanström, M., Lozano-Garcia, F., and Rowe, D. (2008), "Learning outcomes for sustainable development in higher education", *International Journal of Sustainability in Higher Education*, Vol. 9 No. 3, pp.339-351.

Whelan, M. and Reichelt-Brushett, A. (2019). "Using internship placements to road test threshold learning outcomes for environment and sustainability", *Journal of Teaching and Learning for Graduate Employability*, Vol. 10 No. 2, pp.36-49.

Wiek, A., Withycombe, L., and Redman, C. (2011), "Key competencies in sustainability: a reference framework for academic program development", *Sustainability Science*, Vol. 6 No. 2, pp.203-218.

Williams, S. and Schaefer, A. (2013), "Small and medium-sized enterprises and sustainability: managers' values and engagement with environmental and climate change issues", *Business Strategy and the Environment*, Vol. 22 No. 3, pp.173-186. https://doi.org/10.1002/bse.1740

Worthington, I. and Patton, D. (2005), "Strategic intent in the management of the green environment within SMEs: an analysis of the UK screen-printing sector", *Long Range Planning*, Vol. 38 No. 2, pp.197-212.

Wyness, L. and Sterling, S. (2015), "Reviewing the incidence and status of sustainability in degree programmes at Plymouth University", *International Journal of Sustainability in Higher Education*, Vol. 16 No. 2, pp.237-250.

Xu, J. and Li, J. (2019), "The impact of intellectual capital on SMEs' performance in China: empirical evidence from non-high-tech vs. high-tech SMEs", *Journal of Intellectual Capital*, Vol. 20 No. 4, pp.488-509. https://doi.org/10.1108/jic-04-2018-0074

Zhang, T., Surampalli, R., Goyal, M., Brar, S., and Tyagi, R. (2020), *Sustainability: Fundamentals and Applications*, John Wiley and Sons, New Jersey.

Zinkin, J. (2020), *The Challenge of Sustainability: Corporate Governance in a Complicated World*, De Gruyter, Berlin.

TABLE I

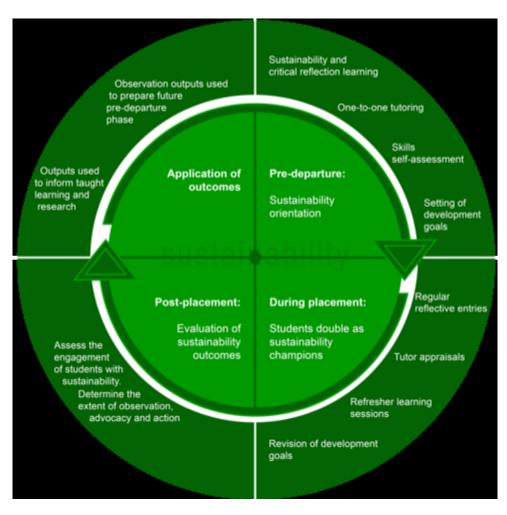| What do I plan to develop?	How do I plan to do this?	How will I know that I have got there?	Target date for review/completion
"Understanding how the industry works and the sustainability measures involved"	"Through going on sites, asking my seniors questions, doing a bit of research myself on certain topics to improve my understanding"	"Once I can make decisions and suggestions"	(None given)

TABLE II

Theme/degree of engagement	What do I plan to develop?	How do I plan to do this?	How will I know that I have got there?	Target date for review/completion
Advocacy	"Work closely with project managers to understand and maintain focus on their analytical needs, including identifying critical metrics and KPIs (Key Performance Indicators), and deliver actionable insights to relevant decision-makers"	"By working under the guidance of managers on assigned projects by (sic) gaining expertise (sic) knowledge of identifying right KPIs"	"By getting in-depth information for making decisions on respective analysis"	"Throughout the internship on different projects"
Observation	"Eye for detail"	"Keeping a logbook with me to record all data so that it can be referred to"	"I will have a logbook with data in it from testing that has been completed"	"20/05/21" (the goal was set in the student's 8th month on placement in mid-March 2021)
Action	"Leadership skills"	"By working with team on different projects and taking responsibilities to reach respective goals together"	"When I can positively influence team members"	"Quarterly review, and completion by the end of the placement"

A proposed circular approach to running sustainability-themed placements

41x40mm (300 x 300 DPI)

RESEARCH INSTRUMENTS

Initial skills assessment

A useful part of preparation for your placement, and indeed for any job in the future, is to assess your professional skills at the beginning and set personal goals for development. The table below covers 7 key skill areas for performing effectively in an organisation as a worker and sustainability champion. Thinking about your own experience, whether at university or in other situations, decide on your current skill level and add any comments explaining your choice.

Skill	Level of skill			Comments
Working with other people	**H i g h**	**M e d i u m**	**L o w**	**Comments**
Description Ability to work collaboratively in a team, to evaluate the role you play and the effectiveness of your contribution. Examples of teamwork behaviours Taking responsibility within group situations; Accepting assistance; Helping others; Understanding team and group goals; Listening to others; Negotiating and influencing; Sensitivity to the values, attitudes and practices of others.				
Communication	**H**	**M**	**L**	**Comments**
Description Ability to listen, speak and write clearly and in a manner appropriate to the situation. Examples of verbal skills Your effectiveness, clarity, manner and tone in different situations such as group discussions; interviews; presentations; using the phone				

Examples of written and graphic skills			
Presentation, appropriacy of style, tone and vocabulary; accuracy of spelling, grammar, punctuation and structure; use of images such as tools, charts and illustrations			
Examples of reading skills			
Interpreting and summarising information; skimming /scanning)			

Planning & organising	H	M	L	**Comments**
Description Ability to successfully plan, develop and oversee projects or events, manage your time and prioritise your workload**.** Examples of planning & organising Ability to schedule and meet goal deadlines; Time management in daily tasks; handling effectively a combination of routine and non-routine tasks.				
Problem solving	H	M	L	**Comments**
Description Addressing barriers and challenges using a positive and methodical approach, including seeking and using appropriate advice from others. Ability to put forward well-informed proposals and seek opportunities to implement them. Examples of problem solving Analysing situations and questioning assumptions; Identifying problems and prioritising urgency; Evaluating alternative solutions; Creativity in finding solutions; Defining tasks; Tracking implementation; evaluating results.				
Self management & development	H	M	L	**Comments**
Description Conscious recognition of your strengths and areas you need to work on. Ability to set, develop and refine personal and organisational goals and seek opportunities to achieve them. Taking active ownership of your role and addressing areas beyond your explicit job responsibilities, where appropriate. Ability to apply your learning and development to enhance your general industry understanding and your career planning including your final year of study. Examples of self-management & development Ability to reflect on performance; Determination in self-improvement; Enthusiasm and motivation; Adaptability; Working successfully alone, in groups and with people in authority; coping positively with pressure and volume of work; focus and concentration				

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Technical skills	H	M	L	**Comments**
Description Familiarity with the topic of sustainability, a range of standard business IT systems and ability to utilise the technology appropriate for your role, function or business sector. Adaptability to further develop your knowledge and competence.				
Numeracy	H	M	L	**Comments**
Description Confidence and competency in situations where you need to be numerate. This may include data manipulation and effective presentation and communication of data-based information. Examples of basic techniques Choosing the best method; Collecting, recording, processing and interpreting data.				
Examples of more advanced techniques Fractions, decimals, percentages, ratios, correlations; Interpreting, understanding and constructing graphs, tables, charts and diagrams; Statistics: compiling, presenting and extracting information.				

Development goals

Use the Initial Skills Assessment to set overall development goals. Talk them through with your Placement Tutor and manager at work, and fill them in before your first monthly log. When making your development plans ensure you use SMART (Specific, Measurable, Agreed, Realistic, Timely) planning, where possible. When setting your goals in months 4-7 and months 8-10 think about the progress with your initial skills and also look at higher level skills that will help you with your graduate career progression.

	What do I plan to develop?	How do I plan to do this?	How will I know that I have got there?	Target date for review and/or completion
Months 0-3				
1				
2				
3				
4				
5				
6				
Months 4-7 (set goals as above if not achieved and add new higher-level goals, depending on your progress)				
1				

2				
3				
4				
5				
6				
Months 8-10 (set goals as above if not achieved and add new higher-level goals, depending on your progress)				
1				
2				
3				
4				
5				
6				

Visit preparation questionnaire – student

This form is to help plan points of discussion for your placement tutor visit. It should be filled in and emailed to your tutor a week before the visit so that they can read it in advance (please also email the employer preparation form to your tutor).

Student name:

1. Please use your monthly logbook to briefly summarise 5-7 key points of learning from your placement so far (use bullet points):

2. Please rate the quality of the work assignments allocated to you so far:

☐ Excellent   ☐ A   ☐ B   ☐ C   ☐ D   ☐ Poor
Comment:

3. Please rate the relevance of the work you are doing to your course of study:

☐ Highly relevant   ☐ A   ☐ B   ☐ C   ☐ D   ☐ Not relevant
Comment:

4. Please rate the relevance of the work you are doing to your career *interests:*

☐ Highly relevant   ☐ A   ☐ B   ☐ C   ☐ D   ☐ Not relevant
Comment:

5. Rate your supervisor's expectations of you so far:

☐ Too high   ☐ A   ☐ B   ☐ C   ☐ D   ☐ Too low
Comment:

6. Rate how well you think you are meeting your supervisor's expectations of you:

☐ Above expectation   ☐ A   ☐ B   ☐ C   ☐ D   ☐ Below expectation
Comment:

7. Please note any particular matters that you wish to discuss with your Tutor during the visit:

Visit preparation questionnaire – employer

Student:

This form is to help plan points of discussion for the student's placement tutor visit. The report below should identify strengths in performance, any weak areas and make suggestions for development. Please discuss the form with the student in advance of the visit and fill in any comments recording your discussion and any agreed actions. Please then pass the form to the student so that it can be emailed to the tutor prior to the visit.

1 = Unacceptable performance 2 = Satisfactory / potential for improvement 3 = Meets overall expectations 4 = Exceeds expectations

	1	2	3	4	Comments
<u>Planning and organizing</u> Attendance, punctuality and time management. Completing tasks effectively under pressure.					
<u>Communication skills</u> Oral and written communication.					
<u>Team working & people skills</u> Working with others to meet goals. Flexibility. Professionalism, adaptability and approachability working with colleagues/clients.					
<u>Problem solving</u> Thinking of solutions to problems /analysing complex problems. Use of initiative.					
<u>Numeracy</u> Use, analysis and presentation of numerical data.					
<u>Technical</u>					

Technical aptitude at appropriate level in the areas of work tasks and sustainability.					
Organization specific skills Knowledge of product / service. Commercial awareness.					
Improving own development and personal effectiveness Attitude and motivation. Perseverance and productivity.					
Please comment on the student's:					
Key Strengths					
Areas which need development					
Overall performance					

Supervisor/manager signature: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Date: _ _ _ _ _ _ _ _