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Editor: Ann Brown

Guest Reviewers: Frank Bezzina with Vincent Cassar, Marie Ashwin with Martin Rich

Editorial to the conference issue

The subject of research methods in business continues to exhibit an extra-ordinary level of activity and innovation, and this conference (the 14th European Conference on Research Methods in Business and Management) reflected this. The current issues that tend to dominate the conference and it's minitracks are - mixed methods (this year with a special issue of it's own); teaching research methods; developments in more standard quantitative methods and a wide range of ideas on the interpretation of qualitative data.

The final selection of papers was made by the editor of the Journal, who is grateful for the help provided by the guest reviewers. The papers selected were chosen for their quality of writing, their relevance to the Journal's objective of publishing papers which offer new insights or practical help in the application of research methods in business research.

The chosen Papers

The minitrack on teaching research methods has been of increasing importance at the last few conferences both in terms of quality and numbers of papers contributed. We include two papers on this topic. Caroline Stockman reviews the special challenges of mixed methods research methodology for the novice researcher – usually a PhD student. She explains, in detail, an impressive range of challenges raised by choosing this research methodology and discusses how the existing support systems for PhD students can be used to help in handling these special problems. Martin Rich makes a strong case for using reflective logs to develop a variation on the standard structure of UG student dissertations. He draws on the experience of a group of management students using reflective logs for their project when working alongside an organisation on a practical task. This enables students to combine the theoretical (reflective log) with the practical (the consultancy project).

The third paper by Karen Finlay-Gough presents a case study investigating the influence that décor elements of gambling environments can exert on gambling behavior. The research methodology is based on scales measuring a variety of factors such as ARGIS (at risk gambling intentions) and REST (replenishment of attention mechanisms). The research methodology problem addressed by this paper is the analysis of the large number of possible combinations of conditions and responses. The approach taken is to develop and report on three types of studies which were designed to provide converging evidence of the emotion and gambling behaviour that are induced by casino settings. The

first method – the conjoint study is perhaps the one, least familiar to researchers, but it is the combination of the three approaches that will probably be of greatest interest.

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The Influence of Casino Architecture and Structure on Problem Gambling Behaviour: An Examination using Virtual Reality Technology

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Abstract: The results of three studies are reported which were designed to provide converging evidence of the emotion and gambling behaviour that are induced by casino settings. Two overall macro casino designs were examined in this research: the *playground* design (high ceilings, spacious layout, the inclusion of elements of nature) and the *gaming* design (low ceilings, maze layout of machines, no extraneous décor). A conjoint study was conducted (n=275) that afforded the measurement of a number of décor variables in combination. Results confirmed that the propensity to gamble beyond planned levels and the level of restoration experienced are both higher for a *playground* casino than for a *gaming* casino; higher gambling was reported when travel distance to a casino was shorter; higher levels of restoration when a music soundtrack was played. Focus group research (n=24) provided rich descriptions of gambling settings, validating the provision of the desired overall macro designs and specific décor elements in casinos. Finally a study (n= 445) was conducted using virtual reality technology, a 360º Panoscope, which immersed participants in a casino settings varying in their overall macro design (*playground* versus *gaming)*, the type of emotion (arousal versus pleasure) induced by a landing strip (entrance setting) and the inclusion of restorative images in the gambling setting. The findings were particularly dramatic for females exposed to a *playground* setting: gambling by females was more conservative in a *playground* setting, with positively-valenced restorative images and with a pleasure-inducing landing strip. For both males and females exposed to a *gaming* design, at-risk gambling intentions were not influenced by landing strip and restorative image interventions. The different pattern of results yielded for at-risk gambling intentions and restoration underscores the potential for research on casino environments to uncover less harmful design elements which have separate effects on these two variables.

Keywords: casino environment, environmental emotion, restoration, at-risk gambling, environmental psychology, multi methods

1. Introduction

The goal of the current research was to examine how specific décor elements of gambling environments influence emotions engendered within a gaming setting and consequently affect problem gambling behaviour. Studies of vulnerability to develop problem gambling behaviour have tended to focus on biological, social, emotional, cognitive and gambling machine factors, while neglecting the role of environmental variables. Yet environmental features may combine to "trigger" the cognitive and behavioral consequences underlying problem gambling (Sharpe and Tarrier 1993). The Productivity Commission Inquiry into Australian Gambling Industries (1999) recognized the centrality of environmental factors in the constellation of influences on problem gambling: "we are referring to environmentally induced conditions which contribute to disassociating the person from the reality of the time and money spent, altering the states of mood or level of arousal and facilitating the opportunity to chase losses" (p. 188).

Several studies have been conducted examining the effects of casino environment as they interact with gambler personality on gambling behaviour (Finlay, Kanetkar, Londerville and Marmurek 2006; Finlay, Marmurek, Kanetkar and Londerville 2007; Marmurek, Finlay, Kanetkar and Londerville 2007). Two over-arching macro casino designs have been identified – the *playground* which corresponds to the form of casino design preferred by one consultant (Kranes 1995) and the *gaming* design, corresponding to the design prescription of a former casino manager (Friedman 2000). According to Kranes (1995), the challenge of casino design is to create legible spaces (i.e., where all design elements are recognizable) that are well ordered with familiar, pleasing and natural elements (e.g.,

vegetation, water, sky design). Ceilings should be high with generous spacing among the structures within the casino. In contrast, Friedman (2000) identifies 13 principles of casino design that converge on the gambling equipment as the focus of the décor.   Design features conforming to those principles include low ceilings and an absence of signage above machines that might draw the eye upwards, away from the machines. A *gaming* design casino would be divided into small, compact gambling areas with short, maze-like pathways.

We have identified two measures of emotional and cognitive effects that are impacted by environmental variations. At-risk gambling intentions (ARGIS) is a measure developed to gauge the extent to which individuals anticipate that they would gamble more money and spend more time than planned in a gambling situation (Finlay et al. 2006). Restoration (REST) is a cognitive state where the effects of mental fatigue are offset and there is an opportunity for attention mechanisms to replenish (Kaplan 1987). Gambling, such as playing slot machines, requires a high degree of directed attention that may lead to mental exhaustion. Repetitive decisions are necessary including those regarding the number of lines to play and the number of credits to bet per line. Expressions of mental fatigue include difficulty in directing attention to the task at hand and being "more likely to take risks, be impulsive and impatient" (Kaplan, Kaplan and Ryan 1998, p. 17). Restorative elements within an environment (e.g., a tropical beach onto which waves are lapping) will attract involuntary attention. The effect of restorative elements, therefore, is to interrupt the directed attention afforded to the monotonous task and refresh cognition.

The effects of several décor elements have been examined within each of the *gaming* and *playground* designs on emotional reactions and judgments about gambling behaviour. In one study, gamblers responded to video simulations of casino scenarios varying in lighting, colouring, design layout and sounds. Variations in décor elements determined how positively gamblers judged the scenario; moreover, those judgments were directly related to estimates of the likelihood of excessive gambling behaviour (Finlay, Marmurek, Kanetkar and Londerville 2010). The complex pattern of outcomes over our research program have suggested that although restoration and gambling intention are positively correlated in general, it is possible to introduce décor variations in specific casino designs to increase restoration without increasing excessive gambling intention or to introduce décor variations that decrease at-risk gambling intentions while increasing or not affecting restoration.

In the current research: we tested additional design variations that decrease at-risk gambling intentions and/or increase restoration; we implemented multiple methods of data collection and analysis that will yield (a) measures of the relative importance of décor variations on emotion and gambling behaviours (conjoint analysis), (b) provide richer descriptions of gamblers' reactions to the design manipulations and (focus groups), and (c) provide stronger ecological validity (testing in a virtual reality environment). This research program afforded convergent validation of the effects of casino design on gambling behaviour and the development of an innovative 360° virtual reality environment which provides capabilities for exploring décor interventions with the potential to reduce problem gambling.

2. Conjoint Study

In our previous research, respondents provided judgments about videos representing a single level of casino décor variation (e.g., flashing lights) within a single macro design (e.g., *playground*).   A conjoint study was designed to identify combinatory effects of manipulations. Conjoint analysis yields indices of the comparative strengths of stimulus element variations when they occur in combination (Dahan and Srinivasan 2000). For conjoint analysis, choice alternatives are described by sets of attribute levels. Respondents rate stimuli varying in the constellation of the levels of specific attributes (e.g., one alternative might combine flashing lights, 30 km travelled to venue, *gaming* design; another alternative might combine static lights, 90 km travelled to the venue, *playground* design). This conjoint analysis indexes the relative importance of each attribute to ARGIS and REST.

2.1 Method

A full-profile conjoint design tested the following attributes: macro design (*playground* or *gaming*); sound (music or ambient casino noise); décor variations (flashing or static lights; monotone or varied colours; crowded or uncrowded venue; symmetrical or asymmetrical layout; chunking or random layout of machines by theme); and, distance travelled to casino (30 km or 90 km). Each factor had two levels except for décor which had 10 levels.

Participants (N=275) in the conjoint study were recruited by newspaper and by posting flyers in a community in Ontario, Canada. To be eligible, participants had to be at least 19 years of age, and had to have played slot machines within the past four months. Individuals participated in groups ranging from 3 to 15 participants with an average of 10 participants per session over a total of 27 sessions. Each participant was paid $30 for his or her time and assistance with the study.

Participants viewed 10 one-minute videos in one of eight random order sequences. Each video portrayed one of two macro designs (*playground* or *gaming*), one of two soundtracks (*music* or *ambient noise*), and one of two levels of one of 10 micro décor element variations. Videos were produced by professional videographers who edited 3-minute versions of the videos used in a previous study down to the one-minute versions required for the conjoint study. Each video opened with a depiction of a highway with a sign that indicated "Casino 30 km" or "Casino 90 km."A full factorial experimental design would have required 80 different venue combinations. Four replicates (sets of videos) with 10 stimuli per replicate (each participant viewed one of the four replicates of 10 videos) would provide comparable statistical efficiency (greater than 90%) to a full factorial design. Accordingly, 40 videos were selected to achieve the desired statistical efficiency

Participant groups were tested in a lab on campus using "Resolver Ballot" software and hardware to monitor and collect responses using handheld keypads, similar to a TV remote control. The Resolver Ballot software controlled the display of the survey questions, collection of keypad responses, and storage of data.

Participants were shown one practice video from a prior study before the 10 critical videos. Videos were projected on a screen at the front of the room. Participants were then asked to respond to ARGIS and REST items. After participants had watched each of the 10 videos, they responded to single questions measuring at-risk gambling intention and restoration as follows:

- ARGIS: "In this place, I would gamble….."
  scale from 1 to 7 where 1 = "about what I intended" and 7 = "much more than intended"

- REST: "I would feel refreshed in this place."
  scale from 1 to 7 where 1 = "totally disagree" and 7 = "totally agree"

2.2 Results

Consistent with previous findings, *playground* scored higher (*M* = 3.35, *SD* = 2.11) on ARGIS than *gaming* (*M* = 2.98, *SD* = 1.99) and higher (*M* = 4.25, *SD* = 1.88) in restoration than *gaming* (*M* = 3.52, *SD* = 1.82).

The conjoint analysis yielded coefficients which provide a measure of the relative importance of each of the tested attributes in explaining ARGIS and REST and thus, the priority in which attributes should be pursued for relevance in casino design to alleviate problem gambling. Macro casino design and sound had the largest effects in explaining ARGIS and REST. The *playground* design was associated with higher levels of both measures, consistent with previous research using more traditional single variable manipulations. Music (vs. ambient casino sound) had an enhanced impact, particularly on restoration. A shorter travel distance to a casino is associated with higher gambling intentions. The effect of only one micro décor element was significant: bright colours were associated with higher gambling intentions.

Table 1: *Importance coefficients of each independent variable for ARGIS and REST*

	Coefficient		Coding
Independent Variable	ARGIS	REST	
Macro Design	**-0.348**	**-0.540**	-1 = *playground*, 1 = *gaming*
Distance to casino	**-0.214**	-0.055	-1 = 30km, 1 = 90 km
Sound	**0.315**	**0.740**	-1 = ambient, 1 = music
Chunking	0.029	-0.097	-1 = not chunked, 1 = chunked
Colour	**0.211**	0.040	-1 = monotone, 1 = multiple colours
Lights	0.094	0.141	-1 = static, 1 = flashing
Symmetry	0.113	0.044	-1 = asymmetrical, 1 = symmetrical
Crowding	0.039	0.059	-1 = not crowded, 1 = crowded

Results in **bold** indicate $p < .05$. It was also found that distance and colour affected intention to gamble independently of any effects on restoration suggesting that intention to gamble is not mediated completely by restoration. Selective introduction of décor elements may reduce at-risk gambling while maintaining the restorative casino experience.

3. Focus Group Study

The goal of the focus group phase was to elicit richer descriptions of gamblers' reactions to the manipulations of the macro designs depicted in video representations of casinos. The focus groups provided introspections about how features of the video impacted judgments of gambling intention and restoration for individuals differentiated on the basis of gambling severity. Participants were paid $50.

3.1 Method

Thirty-two participants from the conjoint study accepted invitations to participate in the focus groups. Assignment to groups was based on scores from the Problem Gambling Severity Index (Ferris and Wynne 2001). Five focus groups were formed. The first group comprised non-problem gamblers (PGSI scale score of 0) and consisted of four females and four males. The other four focus groups were considered moderate to problem gamblers (PGSI score of 3 or more). Across those four groups there were 10 females and 14 males. Participants viewed four 3-minute videos that varied in macro design (*playground* vs. *gaming)* and in one of two levels of one of the five décor elements (lighting; crowding; colour; symmetry; chunking). The groups were asked to discuss what they had seen and to complete the mini-questionnaires assessing ARGIS and REST. The focus groups were audio and videotaped. Transcripts of the sessions were created from these tapes. NVivo software was used to code and analyze a variety of themes .

3.2 Results

Theme analysis revealed several differences between non-problem and at-risk groups. Comments about luck, gambling motivations, payoffs, gaming strategies, randomness and discussion of winnings were all highly popular themes within the at-risk groups (e.g., "the more expensive ones (slot machines) are supposed to pay out more, they're the higher paying ones", "I guess I believe they are random but I have no proof that they are random", "I also think they put certain machines near the entrance that will win frequently and it gets the flow going to that machine"). The most common themes in the non-problem group related to discussion of the atmosphere of the casino (i.e. lights, sky and sound in the casino) and included phrases such as "I think you

could concentrate more if the noise wouldn't be there", "I felt that the lighting for the most part felt very fluorescent", and "I like the sky look on the ceiling, very nice".

Word frequency analysis was preformed for the 150 most common words. Some words were expressed with similar frequency by participants in response to the *playground* or *gaming* videos. For example, those who viewed the *playground* casino designs verbalized 34 general references to "people", such as, "I knew the people at Grand River" and "there (aren't as) many young people". The word "machine" was also noted with similar frequency (38 times) in response to both *playground* and *gaming* videos, e.g., "I don't think I heard any machines going nuts" and "I saw a lot of machines that bored me". The words "loud" and "noise" or "noisy" were also mentioned after both *playground* and *gaming* videos with similar frequency (35 times) in comments such as, "I think it's really noisy" and "you can't help but notice when people win they are so noisy".

Word frequency analysis also indicated words that there were used more frequently in reaction to one or other of the macro designs. For example, words containing the stem "bright" (i.e., bright, brighter, brightest) were mentioned more frequently after viewing videos depicting the *playground* design (14 references compared with 6 references for videos with a *gaming* design).The word "atmosphere" appeared 7 times from those who had viewed a *playground* video and 3 times for the *gaming* videos. Upon inspection of these specific references, however, it appeared that the word was being used in a positive sense for the *playground* design and in a negative sense for the *gaming* design (e.g., "the atmosphere…was just horrendous").

The qualitative analysis of the focus group data indicate that participants noticed the pleasing décor of the *playground* design, such as high ceilings, sky designs and water features. In addition, participants notice micro décor elements in a video presentation of a gambling environment, such as the presence or absence of flashing lights and the crowdedness or relative spaciousness of gambling venues (detailed references can be obtained from the first author). More generally, the focus group data validated the use of videos in eliciting affective and evaluative reactions to video representations of casinos.

4. Virtual Reality Study

The primary goal of our research is to identify casino design and décor variations that enrich restorative experiences while lowering the likelihood of at-risk gambling. In the final study, two additional décor variations were hypothesized to influence restoration and at-risk gambling intentions: the presence of restorative images in the gambling venue, and the use of emotion-inducing landing strips (entranceways). An innovative Panoscope 360º virtual reality methodology was developed for the study to increase the ecological validity of casino representations in our research.

The choice of the restorative image décor variations for the final study follows Kaplan's (1987) identification of the benefit of "soft fascination" that emanates from scenarios such as a scene of waves lapping onto a beach with a single palm tree blowing in the wind. Images delivering soft fascination involuntarily attract attention. They tend to be familiar, easy to perceive and pleasant to view. Restorative images may provide a distraction from the directed attention and repetitive behaviour required when, for example, playing slot machines, much as natural images serve to restore cognitive capacity (Berman, Jonides and Kaplan 2008). The re-directive function of restorative images may remove a gambler from a trance-like state and thus re-establish a conscious attentive state. We tested three levels of restorative images: no restorative images as a control; images which positively deliver a high level of restoration; and, images which deliver a negative level of restoration. It was anticipated that restorative images introduced peripherally (at a 90º angle from the direction of sight within the 360º Panoscope) presented twice (for 20 seconds each time) during the viewing of a 3-minute video simulation of a casino environment might draw the attention of gamblers, thereby sufficiently distracting them from the gambling activity at hand to ground the rationality of decisions about their gambling behaviour.

Underhill (2004) refers to the entrance area (e.g. the entrance to a retail store or, by extension, the entrance to a casino) as a "landing strip" that triggers an orientation reaction: "You walk through any door and suddenly your brain has to take in a load of new information and process it so you will feel oriented" (Underhill 2004, p.48). Whatever lies in the transition zone between the outside and the inside of a venue is referred to as a landing strip. When a casino is not designed to ensure that there is a gentle, pleasurable transition between the outside world (the drive to a casino destination, the arrival from a hectic environment like the Las Vegas strip) to the inside environment of the casino, transition tension or anxiety may be induced before the gambler even consciously begins to perceive the casino floor. Those conditions of induced emotional tension may contribute to riskier decision-making (Starcke, Wolf, Markowitsch and Brand 2008) that may be harmful to the gambler.

Three levels of "landing strip" were tested in the panoscope study: a no landing strip control condition, a landing strip inducing pleasure (e.g., Wynn Restort, Las Vegas) and, in contrast, a landing strip inducing anxiety(e.g., Imperial Palace, Las Vegas). It was anticipated that the pleasure-inducing landing strip would positively orient gamblers to a gambling venue that induced pleasure and a positive restorative experience.

4.1 Method

The Panoscope study was conducted as a 2 x 3 x 3 between-subject design featuring two macro design (MD) levels (*gaming*, *playground*), three restorative image (RI) levels (none, positive restorative images, negative restorative images) and three landing strip (LS) levels (none, pleasure-inducing, anxiety-inducing).

The Panoscope features networked immersive displays where individuals are absorbed in a environment (12 feet in diameter) that surrounds them on a 360-degree basis. Video for the Panoscope is shot using a panoramic, 360-degree lens. The software accompanying the Panoscope (Flash Cut) permits video "panels" to be overlaid during the panoramic play of the video. Use of these panels creates a totally immersive, life-like experience and facilitates the delivery of the manipulations. The Panoscope 360 degree unit is acknowledged as a means of studying environmental effects in a setting as close to reality as possible when researchers had no means of doing so in an actual casino in Canada.

The goal of stimuli presentation in the 360º Panoscope was to provide an immersive reality experience (n= 445) in order to elicit and measure responses to various stimuli in casinos. Participants were recruited from our database of previous participants. They were asked to sit on a chair in the 360º Panoscope where they were shown an introductory video of a neutral environment (inside of an office) with an audio track that provided an overview of the virtual reality technology and that participants were free to turn around in the swivel chair while viewing the videos so they could see what was in front of them or what was behind them in the scenario. Participants were then instructed to imagine how they would feel if they were in the gambling venue they were about to view.

Three-minute videos of a casino setting were produced according to one of the 18 experimental conditions, defined by the 2 x 3 x 3 between-subject design. Each participant viewed one, after which a survey was completed on a laptop computer. The survey included several measures; this manuscript will focus on two key outcomes: At-Risk Gambling and Restoration, including Being Away, Fascination, Coherence and Compatibility components. (Korpela and Hartig 1996). Participants were paid $30 for their participation.

The interaction between type of LS and type of RI was examined. In general terms, it was expected that a landing strip that induced positive emotion would provide a smoother transition into a casino venue than would a landing strip that induced anxiety, particularly when that venue was designed to generate a high level of pleasure (*playground*). Positive restorative images were also expected to decrease ARGIS and increase REST, particularly in conditions where a pleasure-inducing landing strip eased the transition to a casino characterized by a high degree of pleasure (*playground*). Given

gambling differences due to gender (Finlay et al. 2010), this pattern of effects was expected to be more pronounced among females than among males.

4.2 Results

The effects of environmental variables (MD, LS, and RI) and GENDER were analyzed separately for each of the dependent measures (i.e., ARGIS, REST and its four components). Each of those analyses was conducted as a 2 x 3 x 3 x 2 (MD x LS x RI x GENDER) between-subjects ANOVA. Post-hoc contrasts were conducted.

The analysis of ARGIS yielded a significant four-way interaction among MD, LS, RI and GENDER, $F(1, 436) = 2.62$, $p = 04$, indicating that the interaction of LS and RI was qualified by gender and by MD (lower ARGI are preferable from a health policy perspective). The four LS x RI interactions broken out by MD and gender are depicted in Figure 1. The LS x RI interaction was only significant for females exposed to the *playground* design, $F(2, 104) = 2.43$, $p = .05$ (bottom right graph). When females were exposed to a *playground* design with no LS, ARGIS was the lowest with positive RI ($M = 1.99$, $SD = 0.96$). Positive RI, however, did not reduce ARGIS with either an anxiety- ($M = 3.40$, $SD = 1.72$) or a pleasure-inducing LS ($M = 3.24$, $SD = 1.65$). Among females exposed to the *playground* design and negative RI, ARGIS decreased progressively from when no LS was included ($M = 3.97$, $SD = 1.36$), to when an anxiety-inducing LS was included ($M = 3.42$, $SD = 1.30$), to when a pleasure-inducing LS was included ($M = 2.73$, $SD = 1.52$).
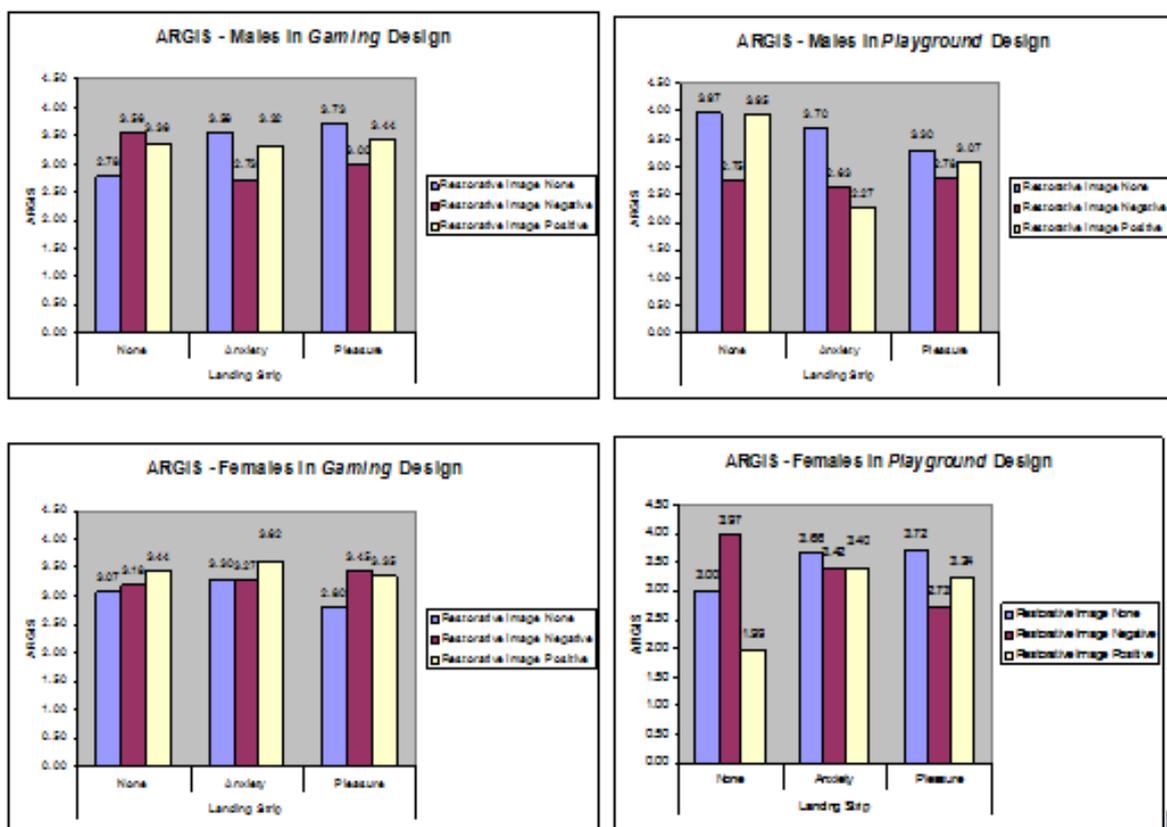

Figure 1: Interaction among LS, RI, MD and Gender on At-risk Gambling Intentions

While the LS x RI interaction among males exposed to the *playground* design was not reliable (top right graph, Figure 1), the main effect of RI was significant, $F (2, 92) = 3.82$, $p = 0.03$, no RI ($M = 3.66$, $SD = 1.42$), negative RI ($M = 2.71$, $SD = 1.70$), positive RI ($M = 3.14$, $SD = 1.41$). The lowest level of ARGIS for males in a *playground* MD, however, was with an anxiety-inducing LS and positive RI ($M = 2.27$, $SD = 1.06$). This ARGIS score was significantly lower than when positive RI were included alone

(no landing strip), (*M* = 3.95, *SD* = 1.22), *t*(31) = 3.29, *p* = 0.004. For males in a playground setting, the beneficial influence of positive restorative images (distraction from a trance-like state) appears to have been most intensely experienced in stark contrast to the initial emotion induced by an anxiety-inducing LS. When both females and males were exposed to the *gaming* design, there was no significant effect of LS, no significant effect of RI, and no interaction between LS and RI (bottom left and top left graphs respectively, Figure 1).

5. Discussion

Consistent with past findings, all three research methodologies confirmed that casino design affects ARGIS and REST experienced in a gambling setting. Given these and reported findings (Finlay et al., 2006; Finlay et al., 2007; Marmurek et al., 2007, Finlay et al., 2010), casino design should be ranked as having high effectiveness potential for problem gambling prevention. No longer is there a "lack of empirical evidence on this issue" (Williams, Best & Simpson, 2007, p. 38).

Macro casino design has a reliable effect on both ARGIS and REST. The *playground* design consistently scores higher on both of these variables. The inclusion of emotion-inducing landing strips prior to entering a casino and the presentation of restorative images during the gambling experience both have a differential impact on gambling intention. The original premise of the current research was therefore validated; casino design variables can be selected to impact variables differentially, decrease at-risk gambling; increase restoration).

For females, if no landing strip is included with a *playground* design, exposure to positive restorative images further reduces ARGIS When females were exposed to a *playground* design with no LS, ARGIS was the lowest with positive RI (*M* = 1.99, *SD* = 0.96). Positive RI, however, did not reduce ARGIS when either an anxiety- (*M* = 3.40, *SD* = 1.72) or a pleasure-inducing LS was included (*M* = 3.24, *SD* = 1.65). Among females exposed to the *playground* design and negative RI, ARGIS decreased progressively from when no LS was included (*M* = 3.97, *SD* = 1.36), to when an anxiety-inducing LS was included (*M* = 3.42, *SD* = 1.30), to when a pleasure-inducing LS was included (*M* = 2.73, *SD* = 1.52).

The added pleasure provided by exposure to restorative images for a *playground* casino design has no negative impact on gambling intentions when no landing strip is included. If a pleasure-inducing landing strip is added to a *playground* design for females, exposure to negative restorative images may provide a distraction that reduces gambling intentions. This finding was unexpected. Either a positively or a negatively restorative image can distract females and return them to a healthier cognitive state. While the LS x RI interaction among males exposed to the *playground* design was not reliable (top right graph in Figure 1 below), the main effect of RI was significant, *F* (2, 92) = 3.82, *p* = 0.03), no RI (*M* = 3.66, *SD* = 1.42), negative RI (*M* = 2.71, *SD* = 1.70), positive RI (*M* = 3.14, *SD* = 1.41). The lowest level of ARGIS for males in a *playground* MD, however, was recorded with an anxiety-inducing LS and positive RI (*M* = 2.27, *SD* = 1.06). This ARGIS score was significantly lower than when positive RI were included alone (no landing strip), (*M* = 3.95, *SD* = 1.22), *t*(31) = 3.29, *p* = 0.004. For males in a playground setting, the beneficial influence of positive restorative images (distraction from a trance-like state) appears to have been most intensely experienced in stark contrast to the initial emotion induced by an anxiety-inducing LS.

For males in a *playground* design, exposure to negative restorative images results in consistently lower at-risk gambling intentions, whether a landing strip (anxiety-inducing or pleasure-inducing) was included or not. At-risk gambling intentions were lowest for males in a *playground* design, however, with an anxiety-inducing landing strip and positive restorative images. For males in a *playground* setting, the beneficial influence of positive restorative images appears to have been most intensely experienced in stark contrast to the initial emotion induced by an anxiety-inducing landing strip. Overall, males respond well to exposure to restorative images (positive or negative) in

a *playground* macro design when a landing strip (pleasure- or anxiety-inducing) is included. For both males and females exposed to a *gaming* design, at-risk gambling intentions were not influenced by landing strip and restorative image interventions. Gambling interventions to reduce harm are contingent on macro, gender and micro design variables.

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Achieving a Doctorate Through Mixed Methods Research

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Abstract: The journey of any doctorate is a challenging one. It constitutes a learning curve for postgraduate students towards becoming effective and fully independent academics. Through a concern for effective mentoring, the challenges of the doctoral effort have been well-documented. The particular issues a Ph.D. student may face when choosing a mixed methods design merits some further attention, however. Mixed-methods research is growing in popularity across academic domains and levels. Achieving a doctorate through a mixed methods study can be a very fruitful endeavour indeed. Excellent core handbooks, example studies and ongoing formalisation of the approach aid in delivering successful work. Yet the chosen methodological path may also bring up some specific hurdles. This paper aims to discuss some of those potential barriers as learning opportunities, and offer an initial discussion of the support systems. Specifically highlighted as potential challenges are the current 'trendy' nature of mixed methods research, the search for optimal design, the development of skills, domain loyalties and paradigm problems, specific difficulties in publishing, isolation threat and justification needs. For Ph.D. students, an understanding of these challenges is a first step towards overcoming them, and achieving conscious competence.

Keywords: mixed-methods, Ph.D.

1. Introduction

Doctoral students occupy a peculiar yet vital place in academia. As learners, they choose to continue an already extensive journey of higher education, which is likely to double their time as students in the formal pursuit of intellectual growth. As researchers, they seek out a new and unique contribution to the academic domain and this makes their efforts so important beyond individual success, to the ultimate advance of academia and knowledge. The challenges these students face are numerous and varied. Thankfully, they have also been well documented in an ongoing concern for effective mentoring (Jones, 2013). As a teaching and learning community, we are well aware of finance and resource issues (Neumann, 2003), psychological adjustment hurdles (Beeler, 1991), difficulties in negotiating multiple roles (Byers, 2014), or the effects of social (dis)engagement in the scholarly community (Spaulding & Rockinson-Szapkiw, 2012), to name only a few examples of potential obstacles. These peripheral aspects are as important as the challenge of the Ph.D. itself, which includes effective research, writing and dissemination of findings, all at a high academic standard.

In this paper, a number of particular challenges are highlighted for the Ph.D. student embarking on a mixed-methods study. Of course, they share the challenges any other doctoral student faces. Yet a number of barriers may occur specifically through the pursuit of mixed-methods research. Some of these may also be encountered by more advanced researchers conducting mixed-methods studies, but the dawning position of the Ph.D. student as independent academic researcher sheds a different light on certain issues. As with all doctoral work, it is important to continue documenting the potential obstacles to ensure effective practices in mentoring and supervision of the candidates.

Also for students, it is no doubt best to commence the journey well-informed. An awareness of possible issues is not only a good step towards overcoming them, it is also extremely useful to self-assess growth as an early stage researcher. Therefore, this paper will highlight some of those issues and discuss them in view of the academic learning curve at doctoral level.

2. Mixed methods research

There is excellent core literature available on mixed-methods research, such as Teddlie & Tashakkori (2009), or Creswell & Plano Clark (2011), and also in domain-specific publications, for example by Johnson & Christensen (2008) for education, Saunders, Lewis & Thornhill (2012) for business students, or Watkins & Gioia (2015) for social work. In this literature, novice researchers can find very good foundational information on the paradigm debate, particular designs and their motivations, or example research and guidelines on the best ways to manage and write a mixed methods study. There is a prevailing perception that mixing methods is fairly new, though many older instances can be found even dating back to the 1920s and '30s. (De Lisle, 2011:89). In the last two decades (Creswell, 2011:22), mixed methods has steadily developed its own typology, terminology and notation system, despite some remaining controversies (p.37). Therefore, its formal existence is dated within the last ten to fifteen years (Teddlie & Tashakkori, 2012:775). It can be argued that viewing mixed methods as a third paradigm is in fact not helpful to overcoming those lingering prejudices. It perpetuates a paradigm debate which creates difference and invites positioning, rather than encourage a flexibility in research to optimise quality of the work.

Nevertheless, practical considerations for the execution of mixed methods research, particularly for postgraduate students, should continue expanding (Halcomb & Andrew, 2009:153). The quality of any research will in part depend on effective management on a pragmatic level. Mixed methods studies come with their own challenges, not in the least because of the priority and timing of the different phases within the study. This paper does not aim to provide a general guideline regarding such management, but flags a number of challenges which the doctoral student in particular will meet on the way. Regardless of the chosen design, a number of issues may arise which are the hurdles to jump on the way to the viva. These are moments of growth on the learning curve, and prior awareness of the potential barriers is a good step towards overcoming them.

The view on mixed methods held here is that method is not the goal of the research in itself. It may for example fit the research question optimally, or it may improve upon the commonly used design by providing a new way of looking at things. With the increasing popularity of mixed methods research, a beginning Ph.D. student may be tempted to follow a trend, or make the wrong assumption that mixed methods research will inherently guarantee that requirement of a new, original contribution to the field. There is also the opposing view, that a mixed methods study for postgraduate students is 'unnecessarily burdensome' (Halcomb & Andrew, 2009:154). The authors' view is that this is not the case. There are plenty of examples where single researchers have achieved mixed methods research of excellent standard (Teddlie & Tashakkori, 2012:777). Mixed methods offers a wealth of opportunity for students to grow as independent, self-sufficient researchers. It should not be discouraged simply to avoid a steep learning curve. On the contrary, doctoral work is meant precisely to challenge on such a high level. With an understanding of those challenges in advance, and effective mentoring, a mixed methods Ph.D. study can be a very worthwhile and successful endeavour.

3. Challenges

Pursuing a doctoral qualification through mixed-methods research means particular challenges will occur on the way. As a postgraduate student, it is important to view these as learning opportunities in the process by which one becomes an independent academic researcher. Facing those challenges and overcoming them enables that growth, and allows the student to successfully continue on the path towards achieving a doctorate.

The following points list such challenges which have been identified in mixed-method doctoral research. They do not form an exhaustive list, nor will they necessarily apply in all cases. This is only a selection of highlights where difficulties may occur as a result of the chosen methodological path,

and for the position of a novice researcher. An awareness of the points below is the first step towards 'conscious competence' (Beeler, 1991), which is the accumulated sufficient knowledge to have a conscious grasp on your own capabilities. Some initial suggestions of what might be helpful to overcome these difficulties are also provided, though a more extensive review of existing support systems will follow later.

3.1 The danger of trends

As already indicated above, mixed methods research is growing in popularity, and with it comes the perception that the approach is fairly new. This creates different assumptions and expectations. A novice Ph.D. student may assume executing mixed methods research is a guarantee for the required original contribution to the field of knowledge. Secondly, the pursuit of mixed methods for the sake of it, rather than in function of the research question. Thirdly, misunderstandings due to limited information exposure. For example, using open answer items on an otherwise quantitative survey tool does not constitute 'mixed methods'. Plowright (2013) found such inconsistencies and various elements of confusion among postgraduate students with regards to fundamental knowledge of mixed methods research.

These assumptions not only affect the mind of the Ph.D. student; recognised academics may fail to be well-informed on the depth of the matter. This is further addressed in the point 'Justification' below. It also highlights the value of having a supervisory team with mixed expertises (Halcomb & Andrew, 2009:158). There is, in any case, excellent literature available to become more acquainted with key debates and arguments, philosophical underpinnings, paradigmatic differences, the variety of designs, or example studies such as Teddlie & Tashakkori (2009), Creswell & Plano Clark (2011), Saunders, Lewis & Thornhill (2012),… To become effective practitioners of mixed methods, a first learning goal is thorough familiarization with this literature (Bazeley, 2003:3).

3.2 Roads diverging

If the choice for a mixed-method approach is driven by the search for a more sophisticated understanding of the subject at hand, then a consideration for the combination of data stemming from the different phases of research is vital. Though there are many combinations possible during every step (collection, analysis, report…), no single mixed method design is used most frequently (Creswell 2010:68). There have, however, been some suggestions for the currently common designs to become more 'imaginative' (Teddlie & Tashakkori, 2012:778). Qualitative and quantitative data can be collected in a parallel or sequential way, more or less corresponding to a chronological or embedded phasing, they can be used exploratory, explanatory or confirmatory, in a cycle or a linear progression,…Next to this, there are more decisions to make with regards to the specific tools or analysis methods used. For qualitative data, for example, is the optimal data gathering instrument a focus group, interviews, documentation, observation,…? It is a matter of picking the right tools for the job. This can be thought of as methodological eclecticism (Teddlie & Tashakkori, 2012:777).

This freedom can be refreshing but also overwhelming to a novel researcher. Upon completion, it will be one of the great affordances of a mixed methods study. It means the Ph.D. student, in his or her development as academic researcher, has achieved a competency regarding methodological choices at doctoral level. They have, in other words, become a methodological connoisseur (Teddlie & Tashakkori, 2012:777).

Choosing the wrong design may prove fatal. He or she will only have some previous experiences providing lessons learnt, and yet the stakes are so high. It is good to be aware of how vital the design is, but the pending choices cannot become self-debilitating. "Learn to take risks, but also to justify the choices made." (Bazeley, 2003:3). It is a first aspect in which the Ph.D. mentor plays a crucial

role, to advise or caution on appropriateness and feasibility during the literature review of possible designs (Philips & Pugh, 2005:40). However, the student should also be encouraged to explore and make their own decisions, at all times led by the research question – not necessarily the domain's traditions or other constraining expectations. Integrated coursework and where possible, previous experience are considered necessary to overcome this barrier (Teddlie & Tashakkori, 2012:777). Brown (2014) found higher levels of prior experience were clearly beneficial, and those students 'were more inclined to cite the need for a course in order to use a mixed methods approach' (p.4).

There is usually a good familiarity with at least one research tradition or paradigm before the start of the Ph.D. In relation to some of the following points, i.e. 'Skillset' and 'The Paradigm Problem', this may be both an advantage as well as a disadvantage. It is time saved, of course, when you are already well-versed in statistical analysis beforehand. Or, interviewing techniques. However, the common acceptance of statistical analysis or interviewing in previous academic studies may be deceiving. It is the typical danger of accepting things as 'normal'. When other paradigms come into play, which is often the cased in mixed methods, the commonly accepted approach may not be so unproblematic. Within the quantitative paradigm for example, qualitative research is regarded as rather biased in comparison to numerical data (Ma & Liu, 2004:62). The opposite is also true, as the ease (and sometimes requirement) of data manipulation in quantitative research is emphasised (Gitelman, 2013). Even for more establish academics, the normality bias is also influential when overlooking common misconceptions, for example in statistical research (Bezzina & Saunders, 2014).

When roads diverge in determining the right design for a mixed methods study, it is important to review each option from an independent, critical stance. In this way, the assumptions that may come with prior experience may not always be the best advisors. An awareness and conscious handling of such inner biases is a trait of any good researcher.

3.3 Skillset

A doctoral degree is a significant process of intellectual growth in any guise. Yet with mixed-methods, the time spent on skill development is likely to increase. There is the simple practical necessity for the researcher to have sufficient knowledge and possibilities to conduct both quantitative and qualitative research in a harmonious and timely manner (Creswell & Plano Clark, 2011:13). This also includes knowledge, informed selection, and competent, critical use of various software programmes such as SPSS or R, or NVivo. With a background in Humanities, developing skills in advanced statistics may not come easy, for example.

There are skeptical voices that would call an advanced competence in both qualitative and quantitative methods 'superficial, perhaps even unworkable' (Denzin, 2008:322). This is too pessimistic, but it cautions towards underestimating development of skills.

There is an ongoing development of courses focused on mixed methods (Early, 2007), but the many existing courses, workshops, online and offline resources available for both quantitative as well as qualitative data gathering and analysis already provide plenty of growth opportunity for the Ph.D. student. In fact, the possibility of selection and choice enables a deep personalisation of learning, and this may be beneficial to the overall evolution of the Ph.D. student to independent researcher (Rich, 2014).

As a matter of management, the existing and lacking skills should be identified at the start of the research, and their development planned into the general timeline of the study. Time is of the essence in a mixed-methods study anyway, as the overall duration of execution in collection and analysis will probably be longer than usual (Halcomb & Andrew, 2009:155). Also, these activities may require travel and additional financing (Halcomb & Andrew, 2009:157).

There are some – controversial – suggestions that it would be acceptable for Ph.D. students to have part of the execution of their research done for them, such as the statistical analysis of a survey. However, this conflicts with the idea that a doctoral study is an independently conducted academic study. A sense of ownership over all components of research, and pride to excel in pursuit of their topic on all levels, should override the challenge of developing skills. Next to this, the analysis is profoundly aided by handling the data directly, rather than merely reviewing results afterwards. Lastly, the Ph.D. study is always about more than the research results, but the learning curve of young scholars to become free, critical, self-sufficient academics.

3.4 Domain loyalties

The difficulty of all mixed-methods is to combine methodologies, and possibly opposing theories, in a successful way yet not be untrue to either domain. This particularly materialises if there are multiple supervisors or mentors, each pulling into a different direction. This challenge is ironically related to the good suggestion that mentor teams or advisory panels should indeed be composed of people with different expertises (Halcomb & Andrew, 2009:158). What should feature centrally is the research question, and from the start, the dominant methodology or theory (or the harmony between them) should be outlined so all parties are aware of the focus. In the text, conceptual tensions should be identified in the same way. In the life of the Ph.D. student, the pull in different directions through his or her support group can be profoundly bewildering. An openness and understanding from the mentors or supervisors cannot be overestimated here. Yet at the same time, this is another point on the learning curve of the Ph.D. student. Academia is buzzing with opposing views and multiple perspectives. This is what keeps the field alive, and stimulates its dynamic nature. Being an independent academic researcher means finding your own informed voice in the debate. Domain loyalties materialise through the people you work with, and these have emotional links. It is important for all parties to keep in mind that academic stance-taking is not a personal matter. It is, in fact, an intellectual imperative.

When the viva comes, that final moment to defend the work, this will be particularly explicit. The role of the viva's facilitator may be particularly vital here. However, it is the moment to demonstrate that learning curve; where the voice of a well-versed, effective practitioner of academic research is meant to come forward and debate the choices made.

3.5 The Paradigm Problem

The height of the paradigm debate in the development of mixed methods research is located in the eighties (Creswell & Plano Clark, 2011:26). However, that does not mean it is an irrelevant matter today, even with a pragmatic research stance. Data collection and analysis are always steps in a broader research philosophy, which needs to be made explicit in any research. In fact, for a mixed methods Ph.D. student, it may be found to be 'the key to resolving thorny issues about the nature and intention of different data collection and analytical activities' (De Lisle, 2011:104). This can happen on both a micro as well as macro level in a study. For example, in Stockman (2015), one of the data gathering tools was a survey instrument. However, this is a tool typically associated with the quantitative paradigm. This is not something which the domain of this doctorate, Cultural Studies, would typically adhere to, due to their theoretical assumptions and historical disinterest in numbers (Deacon, 2008). However, preceding and succeeding phases of research ensured the instrument was well-framed within the more common qualitative paradigm. In the overall design choices, the research overcame the skepticism towards numbers, their easy manipulation or questionable assumption of interpretation objectivity (Gitelman, 2013). Further design choices, even for details, were informed by the same understanding of paradigm preference. To continue the example of the survey tool, Likert scales were used as answer options for some of the items. These are a common device in many survey tools. Cultural Studies, within the qualitative paradigm, is

happy to accept a gradation of reality rather than a black and white (yes/no) version. Open answers would be even more desirable, and indeed the survey included these too, but categorical data is simply more fit for statistical analysis. All the items and wording in the survey explicitly corresponded to data drawn from the qualitative phases. This ensured the answer options were not entirely imposed top-down, yet represented the reality participants had described in their own words. Also, a 6-point scale was used rather than the more common 5-point or 7-point scales. This way, the participant could not choose a safe middle ground, as a cultural sensitivity presupposes there will always be an inner bias towards 'a little more' or 'a little less' on the agreement spectrum.

Having a dominant philosophical stance towards research does not mean a Ph.D. student should swear allegiance to one paradigm. One characteristic of mixed methods research is 'paradigmatic pluralism' (Teddlie & Tashakkori, 2012:779). This means a variety of paradigms may serve as the underlying philosophy. Understanding the various influences, prejudices and possible remedies is one learning goal for the mixed method Ph.D. student (Bazeley, 2003:4).

3.6 Publishing

The need to publish as an academic is a global phenomenon. However, publishing as a doctoral student is likely to also be a formal requirement in pursuit of the degree, and yet challenging due to the inexperience in doing so.

A first particular challenge for the mixed methods Ph.D. student is the aptly named process of 'salami slicing' (Durani, 2006:976). In order to optimise research output, the findings of the study are cut up and disseminated separately. For example, reporting on every phase of a mixed methods study separately. This may confuse the fact that a publication is part of a larger analysis. Cross-referencing publications is one option to remedy confusion and tie the parts together, but the time it takes to publish in peer-reviewed journals may hinder this practice. Another reason for 'salami slicing' might be that there is no suitable platform to publish the research in its entirety. It may be too long for journal articles, unsuitable in book format, and so on.

Secondly, there is a growing search for templates or example reports even for more established mixed methods researchers (Halcomb & Andrew, 2009:159). For example, the order in which the different phases are explained. Next to this, qualitative and quantitative research comes with its own language, and the choice of style, language and voice is therefore another learning curve for the writing skill of the mixed method Ph.D. student (O'Caithan, 2009). This also occurs simply in the writing of the thesis itself, without publication in mind. Creativity and innovative approaches should only be welcomed here. It can be a learning goal in itself to develop a new way of presenting results, particularly where conventional formats don't fit the methods used or information gained (Bazeley, 2003:3).

Many academic journals also tend to favour particular topics or methodologies which can make other research harder to get published. Quoting Dale Goodhue (2007:221): "It is truly difficult and risky to be the first to argue for a new way of thinking about an issue (as a doctoral student named Fred Davis did with TAM). But these are the real contributions to the field. If our doctoral students (and our journal reviewers!) would better understand this, the IS field would be much more vibrant, and contribute more to society." The shared pressure of academia to publish in top peer-reviewed journals applies to mixed-method Ph.D. students as well. The threshold is high, especially when questioning established ways of approaching a topic. "Original research can be dangerous in that it can undermine previously dearly held beliefs and careers." (Lee, 2007:688). However, as mixed-methods research grows in popularity, so will the publishing opportunities in journals and other platforms. Also, the open access movement gains new breath every day.

3.7 Isolation

Within any research team, there is of course a treasure of shared knowledge. Mixed-methods students particularly can benefit from close integration in the group (Shulha & Wilson, 2003; Bliss, 2008; Hall & Howard, 2008). Yet at the same time, the Ph.D. path may methodologically differ from the general trend or beliefs within the team. A Ph.D. student of mixed-methods may simply encounter difficulties or have questions, to which nobody in the team has an answer. Or, colleagues may have opposing views to the work one is doing, which may undermine motivation and sense of place in a social unit. This goes beyond the general solitary experience of the dissertation student to a sense of standing alone in the crowd. In this case, the Ph.D. becomes a balance act to draw from the shared insights where appropriate, yet remain firm in the mixed-methods approach where needed. It is a social skill as much as one of research independence. It endangers intellectual profit to deviate from the plan for the sake of belonging – so intellectual isolation might be to some extent necessary, but there is no need for it to extend beyond that necessity (Philips & Pugh, 2005:73). It's a learning curve: to be independent and firm in research, yet a well-integrated part of the academic community. Good contacts also outside the research team are one way of sustaining that much-needed social aspect of research.

3.8 Justification

Any type of research comes with its own need for justification, of course. Qualitative research battles with notions of subjectivity in its quest for academic yet sensitive rigour of analysis. Similarly, quantitative research faces accusations of data manipulation (Gitelman, 2013), uncritical reports (Deacon, 2008), and so on. It is simply good practice for any academic to have a strict awareness and explicit motivation for what type of research is executed, why, and how.

Mixed-methods research is in itself not yet without controversy. It is the 'Question of Convincing Others', as Creswell and Plano Clark would say (2011:15). Any Ph.D. study will be subject to considerable demand for justification and defense. Choosing a mixed-methods design for a Ph.D. will not make this any easier, especially if some members of the final committee or colleagues are disinclined towards new methodology. However, as already said above, if it fits the research question and the intellectual yield can be demonstrated, it should not be avoided for fear of the defense effort. Ph.D. mentors, existing literature, and the broader network can help to critically arm against the doubts cast. This justification effort will be a continuous demand throughout the journey. Though sometimes tiring, particularly when combined with the sense of isolation described above, it also forms good preparation for the final jury, and for life as an academic researcher.

4. Support

The above points highlight why doctoral students making use of mixed-methods face challenges which are particular to the chosen path. Achieving a doctoral degree through mixed methods research is, however, a possible and fruitful endeavour. Despite the many challenges, there are also support systems in place for every Ph.D. student. The text below discusses their importance specifically for mixed methods Ph.D. students.

Support can be activated in two ways: on the one hand, supporters such as the mentor, the research team, friends, course leaders, and so on, play an active role in providing much-needed guidance for the student. On the other hand, the student should not remain passive, but actively seek out those support mechanisms. It is another step on the learning curve towards becoming an effective practitioner: understanding your own needs, finding those coping mechanisms that work for you, and bringing them into practice as and when required.

4.1 Role of the Mentor

In many ways, the Ph.D. supervisor or mentor for a mixed-methods student will act and react the same as for any other of their doctoral students. Such guidelines for both doctoral candidates as their supervisors are well-represented in literature; for example Philips & Pugh (2005), Finn (2005), Wisker (2012);… For many cases, a tailored approach will work best, although there are common needs. This is particularly relevant for mixed methods Ph.D. students, as the individual nature of every student is even more emphasized by the individual requirements emerging from the research design. This gives rise to ideas for further development in personalising learning resources (Rich, 2014).

The highlights above indicate that perhaps more attention should be given to certain aspects of mixed-methods work. For example, time management from the very start is absolutely essential, as the different phases of the design will take more time, and the development of skills should be planned accordingly (Creswell & Plano Clark, 2011:14). The Ph.D. mentor in many ways has an enabling role which can help the student a long way. To be able to quickly enrol in the correct training course, can make a big difference, for example – rather than wasting time in low-quality or too-advanced courses. Or to have quick and easy access to the right programmes such as NVivo, SPSS or R, rather than having to go through a lengthy administration processes and expenses sheets. These are small things which make life a lot easier.

It would certainly be recommended that the Ph.D. supervisor or mentor has experience of his own in the type of research his student is conducting (Teddlie & Tashakkori, 2012). However, mixing methods is still fairly new and only budding as an acceptable way to proceed for everyone. It is a positive step for instructors to recognise their own lack of knowledge (Bezzina & Saunders, 2014:118). In this case, there should be one (or more!) co-supervisors who are able to provide more focused support on certain aspects of the research (Halcomb & Andrew, 2009:158). This type of mentoring can also proceed informally, something which the main Ph.D. supervisor can enable through recommendations. "The supervisor can choose which gates to open, particularly in the early stages of the researcher's life." (Lee, 2007:688). Regardless of the power implications of this position, it also has an effect on the perception of the Ph.D. student towards to mentor. The Ph.D. mentor becomes 'a broker' (Rich, 2014:135). He or she is no longer someone who knows everything, but someone who facilitates. Interestingly, research has found teachers were most valued for their expertise by students, though they did not consider that expertise directly influential on their learning (Brown, 2014).

4.2 Other Support

For mixed methods research, it seems hard to overestimate the value of team effort, as it has been found many times to be a vital factor (Shulha & Wilson, 2003; Bliss, 2008; De Lisle, 2011:105). The value of formal collaboration has even been called critical for mixed methods research (Hall & Howard, 2008). For the student pursuing a doctorate with a mixed methods study, team spirit can support the endeavour in two ways: academically, and socially.

Academically, it helps budding academic researchers to observe the methodological problem-solving skills of others in the team (Teddlie & Tashakkori, 2012:778). It is also a learning goal in itself to work with other people in different approaches (Bazeley, 2003:3).

Socially, there is that element of emotional support from faculty members which is important to any Ph.D. student (Jairam & Kahl, 2012). This has, however, particular relevance for a mixed methods Ph.D. student, in view of the challenges of justification and isolation. Already noted above is possible differing views on methodology within a research team. An openness from the team both socially as

methodologically does a lot of good (Philips & Pugh, 2005:17). Learning may actually go both ways in this case.

This professional and emotional support goes beyond the immediate research team, to colleagues faculty-wide, university-wide or even in contacts outside the university. Though a sense of isolation may occur, as discussed above, it is simply not the case that a mixed methods Ph.D. student stands completely alone. There are many more doctoral students, and academics, who are conducting the same type of research. Like any other Ph.D. student, it is important to actively network with them at conferences, events, online, through existing contacts,…

Training is another vital support system which will certainly be part of a mixed-method Ph.D., whether it's interviewing techniques, statistical analysis, a more general course on mixed methods,… It directly addresses the 'Skillset' challenge, but also goes a long way to overcome 'Isolation'. Courses and workshops are actually a great place to build up a relevant network of people who are in the same boat. There are always in-house trainings offered by the university, but it pays off to look further afield and make new contacts at other universities, even internationally. Both for networking as the actual skill development, it is worth investing in training. One-to-one tutoring is also highly effective in terms of focused progress.

Much support can also be found in literature and online resources. Mixed-methods is a growing field, and literature is blooming. Therefore, tips and guidance can simply be found by reading a lot beforehand and making your way through someone else's lessons learnt. Within course modules, offering flexibility and choice between smaller units of learning allows to personalise the learning experience. This can be beneficial to the growth of a Ph.D. student as effective practitioner of academic research (Rich, 2014:137).

4.3 Final note

It is important to emphasize, as the start of this paragraph did, that the above support mechanisms can and should play an active role, but that the Ph.D. student should not be passive in the matter. "Be prepared to recognise and admit what is not known, and seek advice" (Bazeley, 2003:3). In other words, you support yourself as a Ph.D. student. Not only in terms of knowledge gaps, but in skills, and attitudinal matters such as persistence and determination. It helps to have supportive friends and family, but your own mindset can help you through the ups and downs of doing research. The increasing self-reliance to seek out solutions to personal needs will stimulate growth towards becoming an independent academic researcher (Rich, 2014:138). There have been some findings suggesting the positive effects of keeping a research journal (Lamb, 2013), which may be one useful pedagogical tool in this process. In doing mixed methods research, it is always important to maintain academic rigour and arm yourself against controversy; but at the same time have fun thinking outside the box.

5. In conclusion

The challenges for mixed-method Ph.D. students are to some extent shared by all doctoral students, and also in part by other mixed-method researchers. However, certain difficulties may arise through the particularity of the chosen methodological approach in pursuit of a doctoral degree.

Firstly, the popularity of mixed methods research and perceived novelty may bring certain assumptions into effect, which are a danger to the quality of the study. Next to this, the many research design choices can be quite overwhelming, yet rather vital to the overall success. Some choices may also lead to conflicts with or within the supervisory team, or more generally towards the established ways of the domain(s) involved. This can be related to the paradigm problems. Although mixed methods research now proceeds beyond the great paradigm debate, it is still

influential on a pragmatic level (and it should be, to ensure correct application of theoretical underpinnings). This is not unrelated to the pervasive need for justification, both formal and informal. As a sixth challenge, publishing is a difficult matter for novice researchers attempting original work, as they struggle to find the right platforms, or lack many concrete templates. Yet they also have to cope with different research languages, styles and typologies. In addition to specific writing and publication skills, the Ph.D. will also entail a more extensive component of skills development for research purposes. Lastly, mixed methods Ph.D. students may face a sense of isolation beyond the solitary experience of doctoral research. This is particularly the case when the existing social unit, such as research team, does not share the same methodological ambitions.

Though these are challenging moments, they are also great learning opportunities. Through overcoming them, the high standards of a doctoral qualification may be achieved, as the postgraduate student evolves towards becoming an effective academic and practitioner of mixed methods research. An awareness of the challenges, and increasing independence in addressing support systems and coping mechanisms will enable the student to profit more fully from the affordances of a mixed methods Ph.D. study.

The Ph.D. mentor or supervisory team plays, as always, a crucial role. The individual nature of every student is emphasised through the nature of mixed methods research, and particular needs which arise for every single student. Here, the mentor may act as a facilitator of research, recognising the need to offer assistance beyond personal expertise. Next to the mentor, the research team is of vital importance for mixed methods research. They can help the student both academically as socially, which is specifically relevant in consideration of the hybrid nature of the student's work. Also, the wider network, provision of training and workshops, a growing body of literature and various online resources, continue to be sources of valuable help towards achieving a doctorate.

To optimise these support systems for the student, it is important to continue documenting the challenges, and compile guidelines for effective practices in mentoring. An improved understanding of common challenges helps to provide a good support base for the student and ensures pleasant and successful years of work, ultimately benefiting the academic community as a whole.

Acknowledgements

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Reflection-in-Addition: Using Reflective logs to Build Research into Undergraduate Projects

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Abstract: This paper explores the scope for using reflective logs as a component in final year projects taken by students on an undergraduate management course. Students often wish to build practical experience into the final year of their degree, but they are also expected to carry out a certain amount of independent research as part of a final year. There can be a tension between students' desire for experience and the requirement for research. The context of this is a management degree where a significant piece of independent work is regarded as a crucial component of the course, but where an unintended consequence of framing this piece of work in a way that encourages autonomy among students, is that there is some ambiguity about quite what students are expected to deliver. An observation made by some of the markers of these projects is that it is not uncommon for them to read like good consultancy reports, which do demonstrate the students' writing skills and often prepare them for their future careers, but which do not necessarily score highly against the criteria associated with a major academic piece of work. Within the author's institution some thought has been given to providing alternative forms of project, and a tangible move in this direction has been to introduce an option where some students combine their project with working alongside an organisation on a practical task. For these students an integral part of the process is the requirement that they maintain a reflective log on their work, following the principles of Schon (1983) in framing and reframing questions to elicit knowledge based on the students' experience. One interpretation of this is that the reflective log can constitute part of the primary data that the students draw on in their research. Such an approach has clear attractions for students and academic supervisors alike. There are well defined formats which a reflective log can follow and which can foster experiential learning (Moon, 2004). Because this type of project is based on practical activities in conjunction with employers, its relevance to students' future aspirations is clear, and because it depends on students carrying out some analysis of their experiences, it offers students some training in using observation and reflection as approaches to research. As discussed by Yanow and Tsoukas (2009) reflection provides a range of different ways to understand the nuances within an activity. Therefore some consideration is being given to the wider use of reflective logs as a component within undergraduate student projects, particularly if these can be framed as part of a process within which the students learn to carry out individual research.

Keywords: Reflective practice, projects, observation

1. Introduction

Reflective practice is central to higher education. Educators are encouraged to reflect on their own activities and to foster a reflective mindset among students. Reflection is one of the key tools used by students to internalise knowledge and understanding. Even where reflection is not explicitly acknowledged as a tool, it facilitates a level of engagement with material and concepts – for example in achieving deep learning (Ramsden 2003) which depends on students organising their knowledge and constructing a set of connections between different concepts.

This paper is based around one particular application of reflective practice within higher education: the use of a reflective log to enhance learning among students working on individual projects within an undergraduate management degree. It draws on experience of a group of students using reflective logs in a particular and closely-defined context and raises the issue of whether such logs could be more widely used.

Within the author's institution, the initial context for this approach was where undergraduate students on a degree in management, given the requirement to carry out an individual project including an element of independent research as part of an honours degree, chose an option based around working within a corporate responsibility team in an organisation. Historically the institution had followed a loose definition of what constituted independent research, at least at the

undergraduate level, and students were encouraged to choose from a range of broad subjects but then to pursue these however they thought appropriate.

The corporate responsibility option, offered as an alternative approach for the individual project, depended on students studying the corporate responsibility team within which they were working, and at the same time reporting and reflecting on their experience. Students would work within the corporate responsibility team on a particular issue facing the organisation.

The focus is on the potential for a reflective log to be central to the creation of this novel type of student project, within which the experience recorded in the log becomes the primary data used by students as researchers. In addition to locating the experience in the context of theories of reflection and pedagogy, this paper considers the scope for broader adoption of this approach. Its aim, therefore, is both to review the practical experience, with some thought given to future implementations of the same approach, and to explore how much further the approach could be adopted.

The paper continues with some thoughts on reflection and discusses some of the influential literature around the area. It continues with a more detailed account of the students' experience of the project approach using reflective logs. There are then some discussions of the benefits and limitations of the approach, with a conclusion considering lessons learned and the scope for further application of reflective logs.

2. Reflection and learning

This section sets out the background to reflection and also explains why it is relevant to the current environment. This is followed by some further discussion of reflective practice and its role in higher education, both at a theoretical and practical level. Finally reflection in higher education is linked to considerations on observation as a research method and on action research.

Schön (1983) identified 'reflection-in-action' as an approach with the potential to identify knowledge, and build new knowledge, based on an individual's practice. To achieve this, an individual needs to reflect actively while engaging in practice, and to use tools such as metaphor, observation, and questioning to explore their practice.

Smith (2011) firmly locates Schön's philosophy as a reaction to the 'stable state': in other words, reflection-in-action is most valuable as a tool to facilitate learning in unpredictable and complex environments. In the context of the needs of anybody entering employment in the 21st century, this translates into an approach which allows them to practise dealing with a set of uncertain and changeable challenges. For university students, particularly those in their final year who should be prepared to enter the workforce in a period of rapid change in the environment within which employers operate, this is a valuable skill. Scharmer's (2009) conception of 'theory U' deals with the challenges associated with changes in the broader environment in the future. Reflection is at the heart of this: it provides a way to achieve the aim of 'presencing' – of sensing what is taking place at the moment but using this to develop a vision of what is possible in the future.

Reflective practice is related to double-loop learning (Argyris, 1991) which requires learners to explore both the immediate problems and challenges associated with a situation, and also the underlying causes. Argyris links the need for double-loop learning to the tendency for learners to overlook underlying causes of a problem because of a set of prior assumptions. While the principle of double-loop learning is long-established, it is particularly relevant to a turbulent and uncertain world where the assumptions behind the underlying causes of a situation are constantly shifting. In the broader context of organisations – not just in higher education but in the environments where students will go on to work – double-loop learning forms the theoretical basis for the emergence of learning organisations.

Kane et al (2004) set out to explore the characteristics of effective teaching in higher education: they identify reflection as a common strand among teachers' development of their practice and also stress that reflection can take various forms. Reflection here is seen as the key to elevating the level of understanding of a subject from the purely descriptive to the scholarly and analytical. Hibbert and Cunliffe (2013) argue for the need for students to engage in reflective practice, along with the recognition of a set of threshold concepts (Land, 2011), but in a different context around responsible management. There are echoes of Schön's arguments about moving beyond the stable state in their discussion of the need to respond to a climate of uncertainty and to the emergence of a series of ethical challenges. Reflective practice offers a way to rationalise and recognise nuanced factors within an issue (Yanow and Tsoukas, 2009) and as such can be valuable in dealing with complexity.

Bleakley (1999) argues for Schön's notions of reflective practice to form the basis for a more complex and considered approach to reflexivity within higher education. While the implications of the term 'reflexivity' are complex, and are discussed at length by Bleakely, it can be understood as something further than pure reflection. Hibbert (2009) links reflexivity and threshold concepts: in the context of management education, reflexivity is a threshold concept in that it takes learners into the unknown and possibly into areas which they find uncomfortable, and it can lead to a fundamental change in a learner's way of thinking.

Reflection in practice can be implemented by students creating a reflective log (Moon, 2004). This can be positioned at a number of different levels: there is a danger that a reflective log could become a predominantly descriptive account of activities, but it also provides the opportunity to create links between theory and practice and to construct explanations for complex observed phenomena. Threlfall (2014) explores the value of a reflective process in encouraging students to take a thoughtful and critical approach to their studies. In the context of the final year of an undergraduate degree course, a practical way to add value to students' experience through reflection is to facilitate the connections between activities in the final year and concepts learned in the earlier years.

So far, the issues raised here have addressed the relevance of reflection to the learning process. However it is instructive to consider the connection between reflection and individual research, at least at the level which could be encountered by undergraduate students.

McNiff and Whitehead (2000) examine the potential for action research, characterised by the presence of iterative processes and the role of researchers as participants, in organisations. They acknowledge a connection with learning organisations, one which is more strongly indicated by Argyris and Schon (1989) in their review of the connections between participatory action research, action science, and double-loop learning. Argyris and Schon recognise the value of a participant observer in understanding organisational processes, but also stress the importance potentially of being able to challenge the theory-in-use that prevails within an organisation.

Silverman (2007) introduces qualitative research as a process of noting and understanding phenomena in everyday life, and advocates an approach with observation at its core. Baker (2006) positions observation as a research method carrying a considerable amount of complexity, but the attraction of using a reflective log as an instrument to achieve observation is that researchers (in the case discussed below, final year undergraduate students with limited time available) can build as much or as little complexity into their analysis as their resources allow.

3.   Reflection in practice as an innovative means to support student research skills

3.1   Rationale and context for a new type of project

This section introduces practical experience of using reflective logs with a group of seven students within a management degree. First the rationale for the particular approach to an individual project containing a reflective log is introduced.   The term 'corporate responsibility project' is used throughout this section to refer to this particular type of project. Then the experience is discussed and the possibility of extending the approach is considered.   These students had applied to participate in a particular type of project, based around corporate responsibility, as part of their final year and the orientation of the exercise towards responsible management is a key driver for the inclusion of reflection. This is a recent innovation and has now been offered to undergraduate management students in two successive years, although it is derived from a slightly longer-standing arrangement offered to postgraduate students.   This paper focuses on the undergraduate experience, and only the undergraduates were required to incorporate a reflective log within their work.

The context to this was the need to incorporate a significant piece of individual work within the final year of a degree.   This usually takes the form of an extended essay for which students are encouraged, but not required, to gather primary data through interviews, surveys, or observation. However there is ambiguity about the nature of this assignment. Is it framed as a piece of research, where students need to understand research methods to a greater or lesser extent? Or is it a more lightweight piece of enquiry, where students need to place their own stamp on their work but they are not expected to apply a very high degree of academic rigour? If it is to be an assignment that boosts students' employability, which understandably is something that students of management want to achieve, is this best achieved through students working alongside people within an organisation, or by carrying out a task which is perceived as valuable for that organisation.

There are a number of more detailed tensions within this arrangement. On occasions, students carry out interviews or surveys but do little to link their results to any theory learned earlier in their course – or indeed to any other part of the project. Students value the opportunity to carry out some independent work, but with employability in mind they are often tempted to choose predictable subjects and areas which they perceive to be predictable and widely understood. For instance, a popular approach is to build a project around a business plan. While this is a clearly defined task, without active reflection on the process it is one with limited academic application. And while entrepreneurship is sometimes seen as a subject relevant to dealing with a changing business environment, there is a danger, in creating a business plan as an academic exercise, in becoming preoccupied with the minutiae of implementing the business and ignoring the broader strategic issues around the positioning of their proposed business. Students often set out to work alongside a business, as a way to gather data, but there is a tendency to document the business's activities without any depth of analysis as to their relevance.

While the principle of the final year project remains highly valued within the institution, there is a palpable concern among academics that its implementation could be improved. On a number of occasions this was raised as a concern at faculty meetings, by staff responsible for supervising these projects. These discussions gave rise to consideration of possible alternative formats for student projects, and the corporate responsibility option was devised as one such alternative format. In its original form, as implemented with postgraduate students, the requirement was simply for students to work, part-time, within the corporate responsibility function of an employer for a while and to write an extended account of the experience. While this satisfied the desire from both students end employers to gain concrete experience which could boost students' employability, it offered limited scope for students to carry out any structured form of research.

When the corporate responsibility project was first offered as an option for undergraduate students, after discussions between the course director and colleagues responsible for implementing the project, the reflective log was added. Reflection was built into the task because of its position within the process of observation, which in turn is crucial to qualitative research. At a practical level, a reflective log is an accessible tool to carry out research through observation, and thus was a valuable component of the one stage within an undergraduate degree where a certain amount of independent research is expected. In this context, then a reflective approach offers scope to bridge the gap between students' desire to gain working experience, and their need to gather and analyse data.

3.2 Implementation of the corporate responsibility project

Students with an interest in the corporate responsibility project were invited to apply to participate, at the start of the final year of their degree. The corporate responsibility project was offered to students as an alternative to the standard project, with the process being more clearly defined, and more focused on a particular organisation, in the corporate responsibility project, than would normally be the case with the standard project. For students adopting this approach, the reflective log became one of the deliverable requirements and a key element of the project, because this constituted a way to formalise the process of observing what happened within the organisation. In broader discussions with undergraduate students, and not only the ones taking the corporate responsibility project, the advantages and disadvantages of using primary data were discussed: for undergraduate students a disadvantage can be that only a limited amount of primary data is available, and it can depend on sampling processes which are crude or even non-existent. For students taking the corporate responsibility option, the reflective log became the students' principal source of primary data. These students had immediate access to the organisations within which they work working, and were therefore in a strong position to acquire high quality observational data. They would use their experience as the basis to write an analytical report, as well as a reflective log.

The implementation included a number of other important factors. Students were expected to draw up a partnership agreement with the organisation with which they were to work. The organisation was expected to focus the student's activities around a particular challenge, or current activity, which was at the forefront of their corporate responsibility activities. While the student was expected to write both a log and a report for the university in as part of their degree studies, they were also expected to provide some assistance to the organisation with which they were working, and in practice there was little assurance that the aims of the organisation were congruent with those of the students.

Some of the students had earlier experience of reflective logs, depending on which path and what options they had taken earlier in their degree. All of them had some training in gathering information and in practical problem solving. However a long-standing challenge on the management degree was to ensure that students drew effectively on this training, as many of them failed to appreciate the relevance of material from earlier years at the project stage.

Nevertheless one of the challenges faced in implementing this approach was that the students, in general, were uncertain of what was expected from them in terms of reflection. They expected clear guidance on the format, and were nervous of including material that might appear critical of the organisations with which they were working, or of the academics involved with the project. Worse, the format that was most tempting to use, which was a simple day-by-day diary approach with minimal analysis of specific themes, actively inhibited students from drawing conclusions or from evaluating their activities effectively.

3.3 Lessons drawn from the reflective logs in practice

So one lesson of the experience concerned the level of guidance necessary for students to write effective and conclusive logs. In particular there was a move away from the diary format towards a reflective log structured by themes (for instance 'challenges faced' and 'dealing with the challenges') and by noting personal feelings and responses. For instance one observation, important to a student and clearly something which they would expect to encounter once they entered the workplace, was 'the culture of the environment and informality within the workspace… baffled me on the first day'. Significantly, this student had expected to work in a more structured environment but welcomed the unexpected informality as a valuable learning experience. Another student, again discussing challenges, expressed concern about the lack of definition in the project specification that they were initially offered, but then wrote powerfully about the efforts made to overcome this. The log observes 'I had to build from my own professional network and avail every opportunity that became apparent' – this from a final year undergraduate student looking for interviewees for data gathering. Fortunately the same student was fulsome in acknowledging principles covered elsewhere in the degree, saying 'I learned about [approaches to deal with these difficulties] from Systems Thinking, which was a core module.

Some useful statements referred to the motivation for students' participation – for example 'as a future entrepreneur I could not pass on the occasion to learn more about corporate social responsibility'.

Perhaps the most significant theme from the reflective logs was that they conveyed both the good and bad aspects of the student experience. One of the students recorded difficulties in getting the support and input from the university that they would have hoped for in the early stages of the project – a specific issue where this student's experience did fall short of what might have been hoped for, but also wrote powerfully about the learning process once these delays were past. Even though the reflective logs in general did not follow a purely chronological pattern, they did effectively convey the sense of students' experiences evolving over time.

3.4 Timing and supervision

Some of the practical issues associated with implementation of the corporate responsibility project stemmed from the relationship between the timing of the project and the academic year. It was not feasible to start the selection process for participants, nor the process of matching successful participants with organisations that they would work alongside, until students returned from their summer vacation for the final year. This had consequences for the timescale for the entire project, and although feedback from students, employers, and tutors has been generally positive there was some frustration that academic supervision was not in place until some time into the students' final year.

The use of the reflective log posed challenges for the academic staff operating as supervisors. Despite the extent to which the task was defined in detail, supervisors, often used to dealing with more traditional projects, found it difficult to adapt to this novel type of project. Little formal guidance was offered as to how to mark the reflective log even though, within the formal mark scheme, a proportion of the marks was set aside for this component of the work. Supervision was divided between a number of academics. Some had been closely concerned with teaching corporate social responsibility to final year students, and were in a strong position to judge the extent to which students drew on concepts from the taught part of their degree. Others had little contact with undergraduate students beyond this particular project, in in some cases needed some guidance on how to calibrate marks – what would be expected of a project that merited a distinction, or a project that was only just adequate, and so on.

An observation from one of the supervisors, specific to the circumstances where students were submitting both a reflective log and a separate project report, was that on several occasions students included material within the log which would have worked better within the report, especially if the log encapsulated issues which would have merited inclusion in the conclusions.

In terms of gauging the success or otherwise of this type of project, all the participants attained marks consistent with either a first class degree or a high upper second. However this was a small cohort and a self-selecting one, so this observation should be treated with caution and certainly does not imply that all students have the potential to attain high marks were they to take the corporate responsibility option.

4. Developing the application of reflective logs and building on lessons learned.

Drawing on Schön's concept of moving beyond the stable state, the process of reflection can be valuable in identifying distinctive and unexpected insights. It is most useful in projects where the scope shifts slightly during the project, as for example in one particular case, for the corporate responsibility project, where the consequence of the student's contribution was partly to tone down the organisation's ambitions set out at the project's inception.

Reiterating the issues covered in section 2 above, it is possible to extract a number of strands and it is worth considering how these related to the corporate responsibility project:

- Double-loop learning: operationalised in the corporate responsibility project by the ability of students, as outsiders, to bring consideration of the broader context to bear on a practical situation

- Threshold concepts and understanding complexity: taking students, even in their final year when as undergraduates they are in danger of becoming jaded with the academic process, into a new and challenging area

- Action research: by students operating as participant observers and potentially recommending change to organisations, they can become action researchers.

There is one additional factor – the need to provide effective supervision for projects with a reflective component. Student projects require a measure of one-to-one supervision and therefore are expensive in terms of staff commitment. Moreover it can be difficult to ensure consistency of approach between different projects and supervisors. Within the institution there is already some concern about the resources necessary to deliver supervision.

One question, in the spirit of prompting reflection by asking unexpected questions, was whether the format with a reflective log as a source of primary data could provide a template for a broader range of projects. This needs to be set against the range of projects that students can undertake, and particularly the point that not every project includes anything tangible that students can reflect on. Observation of events within an organisation is not a technique specific to corporate responsibility. Pragmatically, a possibility is to give students the option of building reflective logs, similar to those adopted for the corporate responsibility projects, into any type of project. It becomes the student's responsibility to ensure that it is possible to provide worthwhile content within their reflective log. But this sort of approach would be relevant to a range of settings, particularly those associated with organisations promoting innovations or in a state of flux for other reasons.

Potentially it would be useful to identify further the characteristics of an effective reflective log – noting that this is produced in parallel with a conventional project report, and working towards a checklist which supervisors can use.

To this end it is worth reprising some of the characteristics of effective logs – these would be worth promoting for corporate responsibility projects and others alike:

- Recognise that the reflective log forms part of the primary data for a project, and use it to foster a reflexive process where the student's learning is directly informed by the content of the log
- Demonstrate evidence of understanding both immediate problems and challenges, and the underlying causes (Argyris's concept of double-loop learning)
- Be prepared to move away from a purely chronological arrangement of a reflective log
- Discuss emotions, responses, and challenges that arise as a consequence of events, and use these to add and recognise complexity within an organisation
- Be prepared to be critical – in practice this may be easier if the circulation of the log is restricted and it is not shared with individuals who might be criticised within the log
- Link the log to concepts from the course, but do not use it to convey concepts which might be better discussed elsewhere
- Ensure that both successful and unsuccessful elements in the activity are included, and use this to foster a thoughtful and critical approach

Conclusion

As discussed above, the opportunity for students to carry out a reflective log in parallel with producing a final-year project (hence the title reflection-in-addition) offers scope for students to build qualitative and observational research into their work. Within the author's institution the reflective log introduced into the corporate responsibility project offered an approach for students to work alongside an organisation, while at the same time recording their observations. The key for the students was to recognise that the reflective log provided primary data for their project, and to use it as a spur to write critically and analytically about their experiences.

While there are many ways to make an undergraduate student project into a piece of research, albeit often a small-scale one, the use of a reflective log has particular attractions. It encourages observation and allows students to build their own complex understanding of a situation. And because it can start with a simple account of what the student has done and what they have seen, it can be introduced as a pragmatic and understandable research instrument.

Returning to the aim of this paper, it became apparent that some important practical enhancements could improve the corporate responsibility project. One, despite the constraints of the timescale, would be to bring academic supervisors into the process as early as possible, to ensure that the whole process is carried out by students with appropriate academic rigour. With a small group (10-15 at the most) of students taking this option there is considerable scope for specialised workshops covering particular aspects of the project process. Reviewing the idea of the log in connection with reflective practice and action research, its potential as an instrument for gathering data is apparent.

Another is to provide more detailed guidance of the process for writing reflective logs, and more checkpoints during the project process where students can check what progress is being made, and whether the logs really do provide material to support a worthwhile project.

Although the log is a distinct deliverable from the project report as far as students are concerned, a final thought is that in practice the two deliverables are closely linked and both need to be taken into account in evaluating student projects.

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