

Introduction of a new reflective framework to enhance students' simulation learning: a preliminary evaluation.

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Abstract

Over the last decade reflective practice has become an integral component of simulation learning that is aligned to learning outcomes in various undergraduate and post graduate health care curricula at the University of Hertfordshire (UH). Ongoing formative evaluations of learning and teaching methodologies in the simulation context have identified the need for an integrative pedagogic framework in order to maximise reflective learning from simulation approaches. This culminated in the development and design of a reflective simulation framework (RSF) to guide and enhance the students' abilities, both during and after their simulation learning experiences. A recent preliminary survey (n=42) was conducted with undergraduate nursing and paramedic students to identify the actual and potential use of the RSF. The data collected indicated that the majority of students are in favour of using the framework for addressing a variety of learning needs, including knowledge development, reflective assignments, and more particularly for feedback and review of the simulation experience and clinical practice issues. The aspects of the framework less favourably scored related to the embedding of reflective learning and planning future actions, suggesting that some students use the framework more for their immediate practical needs rather than for the intermediate planning and longer term applications of reflective practice such as synthesis of learning. That is not to say that students do not think about those aspects of the reflective process and further in-depth studies are strongly recommended for exploring these results in more details.

Introduction

Simulation learning categorised as a “significant form of experiential learning” (Jarvis 2004 pp113-114) is gaining widespread recognition in a wide range of healthcare professions, not only by Higher Education Institutions (Alinier 2007a) but also by professional and governmental bodies (Department of Health, 2006; Donaldson, 2009; Nursing and Midwifery Council, 2007; QAA, 2004). In order to maximise simulation learning, reflective practice is considered to be an important component of this approach and is designed to enhance the students' learning and clinical competencies through the closer integration of theory to practice. This article describes and discusses the results of a preliminary study that set out to evaluate the use of a reflective framework pertaining to the learning experiences of health care students in a simulation learning context.

Background to simulation learning

Simulation learning is not a new idea and has been successfully used in the aviation industry and medical education for well over forty years (Abrahamson *et al.*, 2004; Helmreich *et al.*, 1999; Rolfe & Staples, 1986). At the University of Hertfordshire, reflective practice, already well embedded in nursing curricula since the late 1980s has subsequently become integrated into the paramedic undergraduate curriculum since 1996 with the particular emphasis that contemporary paramedic practice needed to adopt such an approach beyond the traditional protocol and standard guidelines approach to emergency care management. The traditional approaches were considered to be no longer wholly adequate for meeting the diverse health care demands of the 21st century (Jones & Cookson 2000).

Since 1998 reflective practice at the University of Hertfordshire has become a major component of our experiential learning based sessions through low, intermediate and high-fidelity simulation exercises within the various undergraduate and postgraduate healthcare curricula.

The word „simulation“ often means different things to different people (Alinier, 2007b). Consequently, different approaches may not provide the same learning experience to students. Quinn (2000) defines simulation as being “*an imitation of some facet of life, usually in some simplified form. It aims to put students in a position where they can experience some aspect of real life by becoming involved in activities that are closely related to it*”. Gaba (2004) defines simulation as “a technique - not a technology - to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner”. For purposes of our learning, teaching and research initiatives at UH we define simulation here as being 'a scenario-based clinical practice situation performed and facilitated within a safe and controlled environment using either low, intermediate, or high-fidelity approaches' in order to actively enhance the students’ learning and clinical performance.

The level of „fidelity“ underpinning simulation is governed not only by the technology used, but predominantly by the way faculty staff actively participate, either as tutors, actors, or abstain from taking part in the simulated scenario. Scenarios may be entirely student-led, tutor-led or a combination of both (Alinier, 2007b) with an initial emphasis on formative learning. In the context of high-fidelity simulation, scenarios are generally student-led, however educators can remotely control and modify the scenario in a dynamic way, in response to the students’ actions and identified patient outcomes. Although clinical scenarios are usually partly predefined, they are intended to be dynamic and flexible, as their progression depends on the students' learning needs, the necessary curriculum outcomes and the interventions that must be matched appropriately to the patient simulator or actors. These can include specific clinical skills as well as inter-personal skills such as communication and teamwork. Scenarios may be conducted solely from a control room in the simulation centre or by engaging the educator directly as an actor within the scenario itself. Afterwards the educators conduct the simulation debriefing as facilitators

rather than as instructors to encourage and support students' learning in a peer context. This approach generally mirrors the debriefing approaches used in the real world clinical field but without the restrictions of time constraints.

As part of our on-going pedagogic evaluations of simulation learning and facilitation, we had identified the need for providing students and educators with a framework that could help to better facilitate the students' reflective learning, both around the actual scenario-based simulation exercises and hopefully for use in real work place settings. The next section of this paper will identify and discuss the merits and benefits of reflective simulation including the use of the specially designed reflective simulation framework (RSF).

What is reflection/reflective practice?

The terms „reflection“ and „reflective practice“ are used interchangeably in the literature and there are many definitions emanating from various disciplines, most notably nursing and teaching (Loughran, 1996; Reid, 1993). Arguably, it is not a unified concept and it is said to be used loosely "to embrace a range of concepts and strategies" (Hatton & Smith, 1995). However, it is generally agreed by many writers that both these concepts relate to a learning process that leads to new understanding of an experience or situation that should inform future learning developments.

In the context of our curriculum learning outcomes, we identified a need to make more explicit connections between reflective practice and simulation learning in order to emphasise the synergies between the two concepts and maximise the students' learning. We have therefore defined reflective simulation as a „focused, flexible, and critical learning process for recapturing, exploring, and interpreting an episode of practice-based activity (i.e. scenario) in order to develop, enhance, and modify the necessary knowledge, skills, and attributes that can be transferable to real life situations“. This definition emerged from our own pedagogic practice and is intended to inform how the teaching and learning processes around reflective practice could be achieved through the use of a structured approach. Furthermore, a structured approach is compatible with and aligned to our curricula structure of Knowledge, Skills and Attributes (KSA) learning.

Why a framework for reflective simulation?

Since the emergence of Kolb's cycle (Kolb, 1984) a number of other models/frameworks have emerged (e.g. (Boud *et al.* 1985; Gibbs 1988; Johns 1993, 2004) to encourage students to organise and structure their thinking and learning reflectively that is distinguishable from the casual everyday simple reflection. Other writers (e.g. Platzer *et al.*, 1997) suggest that reflective learning can be more potent if a framework is used to guide the inherent processes that make up pedagogic reflectivity. We rationalised the need for a reflective simulation framework (RSF) based on two pedagogic premises that fit well with our curricula outcomes:

- The first premise is that reflective practice should follow a structure that incorporates higher order thinking skills such as analysis, synthesis and evaluation.
- Secondly, that such skills should progress the learning experience from thought to action and future solutions, thereby encouraging an active process rather than the passive activity commonly associated with reflective learning concepts.

The application of higher order thinking skills, as noted above, are important considerations for tutors as well as for learners to ensure the competent transfer of graduate skills appropriate to healthcare professionals who will be expected to demonstrate such characteristics in their day-to-day practice and continuing professional development.

Our design of the RSF is rooted in Dewey's (1933) ideas of reflective thinking, which distinguished a structured approach from that of "automatic, unregulated thinking" (pp 4-9). The framework also promotes the reflective practice ideologies of Schön (1983, 1987) who argued that it is not possible to tell exactly what students learn from reflection *in* and *on* practice thereby providing further justification for our simulation approaches to use a guided approach through the use of a framework. Schön was also a proponent of coaching environments for reflective learning such as simulation settings. In the context of nursing, Benner (1984) had similarly identified simulation as a useful way for students to learn and develop. Lastly, from evaluations of our learning and teaching experiences of simulation developments, we concur with Moon (2000) that reflection does not just 'happen' and students by themselves are not always able to initiate reflective learning processes effectively, thus further impetus for providing guidance to the students through the introduction of RSF.

Previous reflective practitioner work undertaken in our simulation centre identified that students at different levels of study tended to approach the simulation experience with varying degrees of dependence, interdependence, and independence. A substantial critical review of some of the popular existing frameworks in the literature-both cyclical and linear previously conducted (Jones 2008) aimed to explore their use by paramedic students" over a full curriculum cycle. A quantitative survey of final year students" views and observation studies in our simulation learning centre exploring their applications of reflective practice in a particular context, concluded that existing frameworks e.g. Gibbs" Reflective Cycle (1988) were only partly used thus resulting in limited and ritualised reflectivity. Further, it is argued here that some of the models/frameworks reviewed (Gibbs 1988; Johns 1993) are based on the assumption that all learners can interrogate or follow the model equally or that they all have the same learning needs (a one size fits all approach); hence our rationalisation for an alternative framework that emphasises the particular learning context and is responsive to the diverse learning needs of our students.

One of the prime advantages of simulation is that learning takes place in a risk free and controlled environment thus enabling a tailored learning experience to be repeated, reviewed as many times as the learners need to, and as the learning needs change. It

also allows for protected time for feedback, something that is rarely provided or possible in real world clinical practice. Additionally, simulation learning lends itself to the use of structured and focused reflection. We identified that the use of a framework incorporating both reflection *in* and *on* action and aligned to curricula outcomes could be useful for guiding immediate, interim, and long-term reflective learning according to the students' needs both individually and collectively.

Development and description of the reflective simulation framework (RSF)

The Reflective Simulation Framework (RSF), originally designed in 2004 at the University of Hertfordshire, comprises six dimensions (Figure 1). It is a learner centred framework which can be used flexibly to explore the simulated experience in order to enhance learning and practice, and crucially, act as a basis for multiple feedback systems. The framework features six components which are multi-directional in order to accommodate learning in a flexible way. Some of its key design characteristics were intended to:

- Facilitate individual and collaborative reflection
- Focus and integrate reflective learning - linking theory and practice
- Emphasise active learning
- Promote reflection before, during, and after simulation activities.

The RSF is designed to provide students with immediate and continuing reference points on what the issues were in order not to lose sight of their immediate concerns as well as any subsequent issues that may arise. The framework also allows the students to signpost their concerns and prioritise their learning accordingly. In the short term, for example, their concern might be the immediate patient outcome, in the medium term their concern might be about the process of intervention (i.e. protocols, documentation), and in the long term it may be about alternate future actions that could help them to develop their competence, confidence, and safe practice.

The multidimensional design of the RSF incorporates the cognitive, affective, and psychomotor aspects of learning and integrates simulation learning by promoting a holistic approach. The key concepts inherent in the framework are the promotion of reflective learning for feedback and feed-forward purposes. The supporting rationale is that learning from the simulation experience can be lost given that the scenarios can be highly challenging and complex at times. The result is that students can often become overwhelmed when attempting to process their learning in an objective way, hence the need for an objective supporting framework to bridge any missing gaps in reflectivity and a structure to provide recordable evidence of the activities.

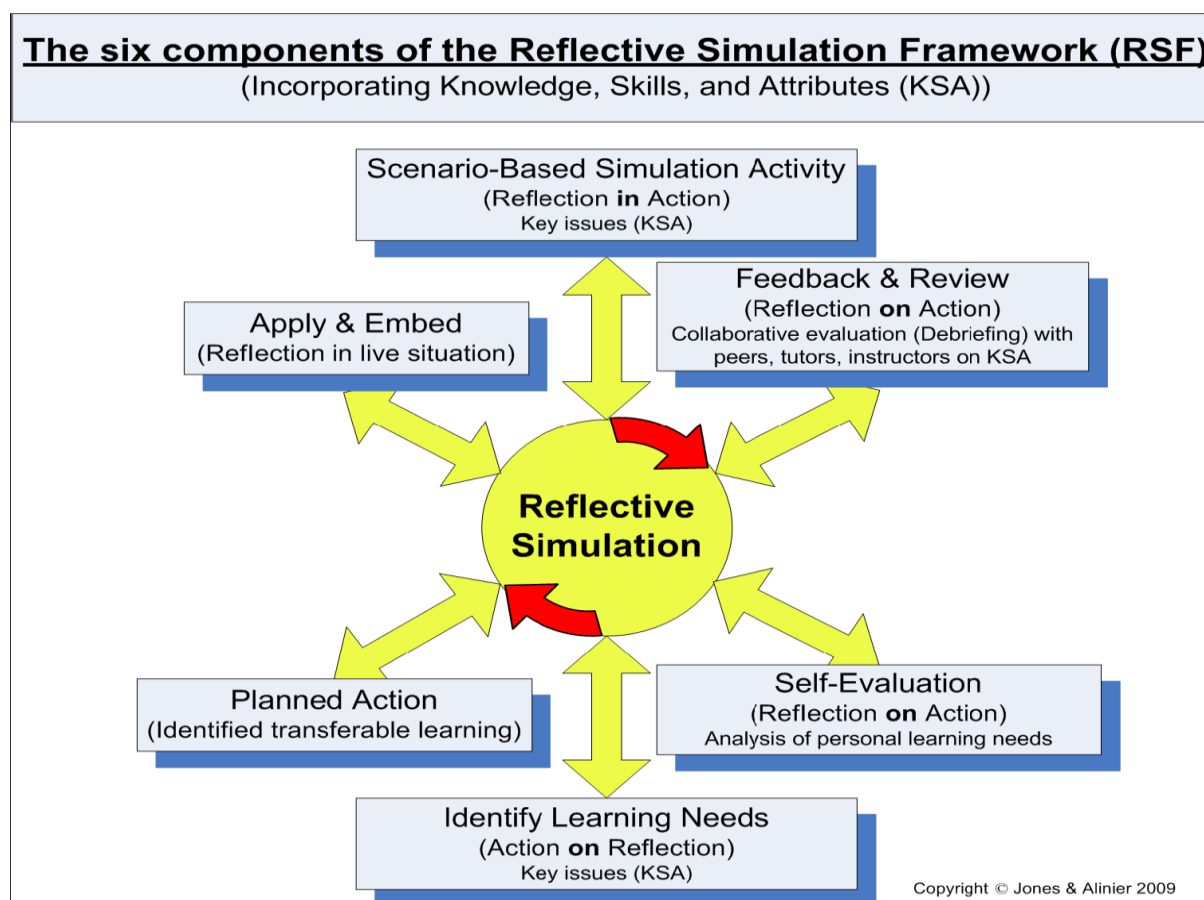
Furthermore, the framework can be used to promote written reflection as well as verbal debriefings by educators and students alike. The framework is intended to be transportable in pocket size cards and can be used to guide the debriefing post scenario experience. It can be used as an aide memoir for quick reference to trigger and focus the reflection process appropriately. In the card format the intention is to provide an

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immediate visual source of reference while the reverse side of the card can be used to write brief comments for aiding later reflective learning.

Overall the RSF can be considered to be a dynamic framework for structuring the debriefing of dynamic scenarios which in simulation learning can be quite complex (Breuer & Streufert, 1996).

Figure 1: The Reflective Simulation Framework



In the following section we present the results of a preliminary study that was conducted to test the use of the framework with a range of undergraduate healthcare students at the University of Hertfordshire.

Preliminary evaluation of the reflective simulation framework

A series of non-participant observations undertaken in 2007 as part of normal reflective practice sessions within our simulation centre with final year paramedic students, identified that students focused more on analysis of clinical aspects e.g. technological equipment, physiological signs and symptoms, and personal issues such as confidence and competence at the expense of other important aspects of KSA such as synthesis of

what had been learnt and how this might influence experiences thus incomplete reflectivity.

As a result of these observations we decided to introduce the use of the RSF to identify whether or not students would benefit from the use of a framework to draw out the wider benefits of simulation learning, such as communication and inter-personal skills, synthesis of learning and further learning needs.

The current preliminary study reported here was conducted under the University of Hertfordshire's Reflective Practitioner Guidelines (UPR AS/A/2) which permit the evaluation of learning and teaching tools that fall outside the parameters of empirical research which require formal ethical approval. However, we ensured that all questionnaires were anonymous and written informed consent was nevertheless sought from all the students who agreed to take part.

A survey questionnaire comprising 11 questions asked nursing and paramedic students (n=42) to comment on the following areas:

- The usefulness of a framework for reflection of the simulation experience including debriefing
- Component of the framework which triggered its use
- Potential use of the framework outside the simulation context
- Most and least useful aspects of the framework
- What „learning needs“ did the reflective framework help them to identify
- Use of the framework for academic learning as well as clinical practice
- Usefulness of having a pocket size card of the framework
- General views of using the framework

A summary of the results are presented below.

Results

In this section we present a selection of the raw data. The results suggest that for some of the questions some of the students selected more than one item even though they were asked to identify only one component as shown in tables 1 and 2.

In terms of usefulness to having a framework, a 5-point Likert scale (1=not useful, 5=very useful) was used to measure the responses from the students. The mean response was 3.98 (SD 1.05). With regards to the component which initiated their use of the framework, 71.4% of students identified "Feedback and Review". However, 80% of the students indicated that they would use the RSF outside the simulation context. This result prompted us to look for any emergent patterns or themes i.e. "*linking categories conveying similar meanings*" (Holloway, 1997 p152) in the students written responses to this question.

Following thematic analysis of the raw data of „where else“ outside of the simulation context students might use the framework, a majority of the responses related to clinical practice e.g. "all placements", "work environments". Some of the reported benefits to academic studies included: "having a step by step guide", "writing reflective notes" and

“improvement of knowledge”. Students generally identified that “Feedback and Review” and “Simulation activity” as the two leading items in the framework (Table 1). It is interesting to note that students identified knowledge and skills equally, more so than for personal learning (Table 2). When asked to identify their learning needs as a result of using the framework, 47.6% of students indicated that clinical skills were the leading item (Table 3). Finally, 64.3% of the students said they would find it useful to have a pocket size copy of the RSF to further assist their learning.

Table 1: Components of the framework which was identified as the most useful by the students

Most useful component of the RSF?	Responses	Percentage response
Simulation activity	17	40.5
Feedback & review	22	52.4
Self appraisal	6	14.3
Identify learning needs	6	14.3
Planned action	3	7.1
Apply and embed learning	4	9.5

Table 2: Aspects of the framework which were found the most useful by the students

Aspects the framework is the most useful for?	Responses	Percentage response
Learning about yourself	11	26.2
Developing skills	20	47.6
Increasing your knowledge	20	47.6

Table 3: Learning needs identified by the students as a result of using the framework

Identified learning needs:	Responses	Percentage response
Communication skills	14	33.3
Guidelines/Protocols	11	26.2
Clinical skills	20	47.6
Theory	12	28.6
Patient assessment	16	38.1
Diagnosis/Treatment	15	35.7
Technical skills	6	14.3

Discussion

Reflective simulation is an emerging concept in our undergraduate healthcare curricula which has been developing more formally over the last 5 years through the use of the RSF. This preliminary study has presented some findings of a small scale evaluation designed to test the usefulness and acceptability by students of a structured reflective simulation framework for its actual and potential use in supporting their reflective learning. We acknowledge the limitations of the raw data and suggest that our study is best seen as a springboard for further developments where currently there were little or no similar studies on reflective simulation available up to the time of reporting.

Evidence of formal evaluations of reflective frameworks/models in the literature is notably absent apart from one theoretical review (Ghaye and Lilyman 1997) and limited evidence in one study (Burnard 2000) which showed that a structure can be perceived to be limiting by some students. Our evaluation suggests that the majority of students (over 70%) generally found the use of a framework helpful to their learning and clinical practice.

While it is encouraging that the majority of students are favourable to key aspects, such as the development of knowledge and skills, we have also identified that other key components of reflective simulation (i.e. Identify learning needs, Planned action, Apply & embed learning) as indicated by key theoretical concepts of Kolb (1984), need to be highlighted to students and educators alike so that fuller reflectivity can be achieved.

Fuller reflectivity necessarily involves „synthesis“ of learning which is argued to be *“the operation that gives extension and generality to an idea as analysis makes it distinct”* (Dewey 1933 p158). Analysis and synthesis of learning are explicit outcomes to be achieved in the curricula context and for eventual transfer to work-related situations. Crucially, the purpose of reflective practice is to actively seek opportunities for future actions and applications of what has been learned otherwise it remains a theoretical and passive concept.

This idea is supported by key proponents of reflective practice e.g. Boud *et al.* (2006) who advocate that reflective practice needs to be reviewed and resuscitated so that it is more closely aligned to real world practice. We believe that high-fidelity scenario-based simulation especially, closely mirrors real world practice and that the RSF provides real opportunities for achieving a renewed impetus for active and effective reflective practice learning.

Although we offered students the opportunity to comment openly on their experience of using the framework, unfortunately the majority were not forthcoming. Only two students responded to this request in the survey and indicated that the framework could be useful to reflect on „life experiences“ and „plan care treatment“. A more in-depth study of the use of the framework would need to be carried out in order to gather qualitative and quantitative data that might illuminate some of the students“ responses in more detail. Externally, however, other interests in our preliminary work are emerging.

Two other Higher Education institutions nationally and internationally have expressed interest in this work following our earlier dissemination of the RSF (Jones & Alinier, 2006) suggesting that there is a potential for wider implementation of the RSF beyond the disciplines studied.

Although the RSF has been designed and evaluated within a healthcare simulation context involving a preliminary study, we suggest that the framework has the potential to be applied to other groups of learners in a variety of disciplines where reflective practice might not currently be a feature of their curriculum as well as where it may already be established and/or being further developed. For example, work on formative assessment such as the use of Objective Structured Clinical Examinations with nursing students (Alinier, 2003) has been adapted with support from a grant from the Higher Education Academy Engineering Subject Centre to be implemented in electronic engineering (Alinier & Alinier 2006a; Alinier & Alinier 2006b). This year (2009), marked the fifth anniversary of the successful use of OSTE (Objective Structured Technical Examination) at UH which incorporates reflection as a formative assessment tool within a first year module. The next stage, including a whole curriculum approach to simulation learning is planned for further research development of the RSF and will be reported elsewhere.

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