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Scenario-based learning: How can it contribute to clinical education?

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1 | INTRODUCTION

All healthcare professionals receive 'scenario-based learning' (SBL), often unawares. Seeing examples of positive and negative interactions between practitioners and colleagues, patients and relatives is a powerful form of vicarious learning, for good or ill. The SBL approach posits that exposure to such powerful learning opportunities should not be merely left to chance.

Seeing examples of positive and negative interactions between practitioners and colleagues, patients and relatives is a powerful form of vicarious learning, for good or ill.

The term 'scenario-based learning' (SBL) was first used in the late 1980s and early 1990s to describe computerised scenarios used for instruction. The approach emphasised engaging learners in authentic representations of tasks that reflected the ultimate goal of the education.[1] In turn, SBL is informed by situated learning theory that suggests that learning should be placed in the context in which the skills and knowledge gained are to be deployed.[2] Thus, the knowledge to be acquired, often procedural in nature (i.e. how to *do* something), is embedded within an authentic context and culture. Therefore, this approach is intended to form a bridge between semantic (fact-based) knowledge and the practical application of learning.

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In traditional simulations, a workplace situation is physically recreated with actors, mannequins or other props. In contrast, in SBL, the contextual elements are invoked via *low-fidelity* simulation. This usually means presenting situations in a digital format that uses text, video, or augmented and virtual reality environments. The rapidly expanding use of digital media for education has stimulated an increased interest in the SBL approach for teaching and training generally. Using low-fidelity, interactive digital simulation is also the basis of situational judgement tests (SJTs). Performance on SJT-type assessments have been shown to predict important, interpersonal aspects of behaviour in medical students and doctors.[3] This immediately raises questions about whether the SJT format could also be used for educational purposes. Indeed, some SBL systems could be considered developmental, or 'dynamic SJTs', where a learning environment, incorporating feedback, is created within the test itself. In dynamic tests, the resulting score thus partly reflects the learning that has

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TABLE 1 The distinctive features that define scenario-based learning (SBL).

Feature	Description/examples
The use of a brief scenario that depicts, or invites, an element of *interpersonal interaction*	This interaction could be direct (e.g. speaking to a patient) or indirect (e.g. referring a patient to a colleague)
The knowledge to be gained is *procedural* in nature, though relevant factual knowledge may also be included	This could be understanding how to respond to a patient, colleague or carer's question or concern about a test result. Whilst relevant clinical factual knowledge may be required to make an optimal response, the main focus of the SBL task is the procedural knowledge; that is 'how something should be done'
The depiction of the scenario is *low fidelity* in nature	This could be via digital footage, still cartoons (or stylised pictures), animations, audio, text or virtual or augmented reality. In contrast to traditional simulation, live actors and physical props are not used
The learner must *interact* with the system	This could include choosing from a fixed range of responses (i.e. 'multiple choice' format), providing verbal or free-text answers into an online or otherwise digital system, or discussing the possible responses in a live-group setting
The learner receives *feedback* from the system in relation to their response	This can be automated and/or via a human facilitator and encourages learner reflection. This could be very simple direct such as '*this is the incorrect answer*—try again!' to depicting how a scenario plays out, given the choices made (see the example shown in Box 1). Optimal choices will lead to more desirable outcomes for the characters, potentially including the learner as the protagonist, depicted in the SBL

taken place during testing.[4] SJTs themselves draw from similar theoretical roots as SBL, in terms of embodied (situated) cognition. That is, learning occurs via cognitive processes that are situated in a particular context. These influence a learner's evaluation of external and internal cues.[5] Externally, this could be informational cues about the environment (including other people). Internally, it could be via emotional states and sensations (e.g. fear or excitement). Suitable scenarios can be created using the 'critical incident technique' to capture situations from those with relevant live experience (e.g. clinicians and patients) that challenge clinical or interpersonal judgement.[6] A variety of behavioural responses are also generated and rated according to perceived effectiveness. Such design approaches are likely to be similarly useful when developing SBL material. A 'theatrical' approach can also be taken. This entails pre-defining the specific procedural knowledge to be learned. A 'stage' is then set, with roles (characters), props and a script. These are intended to provide the learner with the required contextual information to make an informed, interactive response to the situation presented.

Given the similarities to other educational methods, such as problem-based learning, case-based learning and simulation, is SBL a truly distinctive approach? Or merely an old pedagogical wine in a new, digital, wineskin? We suggest that SBL be defined by the following five features, listed and described in Table 1.

SBL can be defined by five, distinctive features (Table 1).

Case-based discussions, like SBL, are also aimed at bridging the knowledge-application gap. However, these would normally involve relatively lengthy and detailed scenarios.[7] In contrast, SBL tends to use briefer scenarios, which may focus on one aspect of an interpersonal interaction or management of a clinical situation. SBL-type approaches are already being extensively used in clinical training. Commercial and free resources for creating SBL-based material are available. These can be implemented and delivered by educational software, such as SoftChalk.[8] Tools and examples are also provided, free, by the 'Widening access to virtual educational scenarios' (WAVES) network (www.wavesnetwork.eu). One text-based WAVES example, for medical students, involves the learner deciding how to respond to the following situation, and is summarised as follows:

BOX 1. Example of a traditional, text-based scenario-based learning item (based on an example available from the WAVES network; www.wavesnetwork.eu)

A 29-year-old married man with two children consults you, as his GP. He presents with a variety of symptoms that makes you concerned that he may have HIV. The man says he sometimes has unprotected sex with sex workers. He subsequently agrees to an HIV test and agrees not to have unprotected sex until the test results come back. The test comes back positive and the man is said to be devastated but then becomes angry, saying he does not want his wife and children to know, abruptly leaving the surgery. The SBL system then offers the learner a number of response options. For example, the initial choices are:

- Phone the patient's wife and ask her to come and see you urgently?
- Simply wait for the patient to contact you?
- Phone the patient in a few days?

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Depending on the choices made the rest of the scenario shown in Box 1 unfolds in a 'non-linear' (branching) way, with further choices being offered to the learner as applicable. The ultimate outcome of these choices may be more or less desirable (i.e. contact with the patient may be permanently lost, the patient's wife may become angry at the GP [played by the learner], etc.).

Whilst the above example is a simple, text-based SBL item, the use of audiovisual material can provide more information to the learner, such as non-verbal cues, the tone of voice of the 'actors', etc. Moreover, as the use of artificial intelligence expands throughout clinical education, then such emotional communication in the learner's responses could also be detected, quantified and fed into the interactive elements of the SBL system. Indeed, this functionality would seem vital to capturing some of the socio-emotional skills required to effectively manage certain interpersonal interactions.

The SBL approach therefore offers a number of potential benefits but also presents with some limitations. One of the strengths of SBL is that it can be implemented at scale, digitally, increasing the reach of training. Learners can also access the educational material at a convenient time. The digital format facilitates 'bite-sized' learning with refresher sessions, and potential gamification elements, that can help engage some learners. The material can be designed to be emotionally connecting, also potentially positively influencing empathy and attitudes. This would usually have required more resource intensive methods, such the use of live actors in role-play. Perhaps, the main potential of SBL will be in complementing traditional simulation training and actual workplace experience when developing key 'non-academic' abilities. These could include the empathy and conflict-resolution skills required to sustainably deliver compassionate, person-centred care. Such aspects of interpersonal effectiveness are likely to be especially important in healthcare settings involving considerable emotional labour.[9] As such, they are key potential targets for SBL-based training. These human qualities are only growing in relevance in an increasingly automated and digital healthcare environment. Moreover, SBL, itself, is well positioned to harness such technology.

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A key potential weakness of SBL is its low-fidelity simulation approach with reduced realism and interactivity compared with more traditional simulation training methods. This could mean that the emotional state in a high-stakes situation, such as a resuscitation scenario, is less likely to be reproduced. Thus, learning may be less likely to generalise to the actual workplace. Initial development of SBL systems may be relatively costly compared to more didactic teaching, such as lectures. Also, SBL may not evoke the desired behavioural responses in real world or higher-fidelity simulated encounters and does not allow for the give-and-take afforded, for example, with human actors. As with PBL, an SBL approach applied in a group setting could facilitate interprofessional education. However, if automating individual feedback based on a particular learner's response it is likely that discipline-specific programming will be required. This is because, as with SJTs, what might be considered optimal, and less desirable, responses, may vary by health professions, as well as across situations. To some extent, these weaknesses may be offset by the scalability and efficiency of SBL approaches. It is becoming increasingly feasible, with the emergence of 'large language models' (e.g. ChatGPT4), to support user interaction through AI-supported chatbots embedded in the SBL activity.

One study of the use of an SBL approach in nursing students reported that active learning was associated with satisfaction with the educational activity. Clear objectives and active learning were both independently associated with self-confidence in managing the simulated clinical situation.[10] Another study evaluated perceptions of SBL in dental students. A thematic analysis of learner feedback highlighted that the SBL was experienced as engaging, interactive, relevant, and critical. At follow-up, 48% of the senior dental students recollected the SBL cases and felt it had prepared them to deliver actual dental care.[11] However, generally, there is currently a dearth of high-quality evidence regarding the effectiveness of SBL in health professions education, for example, in enhancing communication skills.[12] In particular, it is important to establish how the approach is optimally implemented across settings and training stages. Research should also focus on whether SBL can positively impact key staff-focussed (e.g. burnout, attrition, etc.) and patient-related outcomes (e.g. satisfaction, treatment adherence rates, etc.). Thus, there is an urgent need to identify the optimum implementation of SBL and thus its place in the clinical educational toolkit.

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AUTHOR CONTRIBUTIONS

Paul Tiffin A: Conceptualisation; writing—original draft. **Robert Klassen M:** Conceptualisation; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the creation of the current article.

ETHICS STATEMENT

The authors have no ethical statement to declare.

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