NEW EDUCATIONAL METHOD

Linking Out Loud (LOL): Developing critical thinking [version 1]

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Abstract
This article was migrated. The article was marked as recommended.

Background: Developing critical thinking in health care education is pivotal in student development and patient outcomes. Gamification and learning through play within health care education is rising in popularity and may assist to develop problem-solving and critical thinking skills.

Aim: To develop and enhance students’ capacity to rapidly recall and communicate critical links in practice through a modified ‘snap’ game.

Method: Students are provided decks of cards depicting clinical pictures (syringe, bath, blood, medications etc). Turning over two cards at a time, the students race to link the two concepts together.

Findings: Linking Out Loud was well received by students and worked to develop knowledge, critical thinking, communication and problem-solving. Linking Out Loud could be easily replicated for all health disciplines.

Keywords
critical thinking, gamification, midwifery, learning

Open Peer Review

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2. Puja Dulloo, Pramukhswami Medical College
3. Susan Van Schalkwyk, Stellenbosch University
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Any reports and responses or comments on the article can be found at the end of the article.
**Background**
Critical thinking is the process of making objective analysis and evaluation of an issue. Critical thinking requires high order cognitive processing that facilitates contextual decision-making and problem-solving and is critical for all health care practice. Developing critical thinking has been identified as assisting to improve patient outcomes and increasing levels of job satisfaction (Alfaro-LeFevre, 2016). Higher education organisations tout critical thinking as being one of their graduate qualities; however, the development of critical thinking is inherently difficult. Despite the clear benefits of critical thinking, it has been identified as difficult to teach, requiring deep level thinking and can be impacted on by the knowledge base level specific to the subject area (Willingham, 2008).

Gamification is a relatively new concept in health professional education (Brull and Finlayson, 2016), however, it is rapidly becoming recognised for its potential to improve student learning (Castro and Gonçalves, 2018). Known benefits include autonomous learning, non-threatening and safe learning environments, development of problem-solving skills, and increased knowledge retention rates (Castro and Gonçalves, 2018, Woolwine, Romp and Jackson 2019). Using gamification theory, we developed a ‘Linking-out-Loud’ game for midwifery students. It encourages students to draw on their own clinical and theoretical experiences and understandings to spark clinical debate and discussion, and develop critical thinking skills.

**Aim**
The aim of this project was to develop students’ capacity for rapid recall and critical thinking, and identify factors influencing midwifery care through gamification. A secondary aim was to develop and enhance the students’ ability to communicate effectively while sharing knowledge and understanding, while linking theory with practice.

**Method**
The ‘Linking-out-Loud’ game is based on the card game ‘snap’. In this game, students work in small teams of up to five. Each team is provided with a deck of approximately 50 cards, each containing a different image depicting a clinical midwifery situation, product or concept. Images of items such as a medication, a catheter, bed, bath or a picture of a pregnant woman are used. The students place the shuffled cards face down in a deck. The first student turns one card and the second student turns another. With two cards visible, the two students look at the images displayed and then race to ‘snap’ on the cards once they can provide a link between them. This creates anticipation, relying on rapid recall and provides low-stress competitive fun. It is important that the two students flipping the cards are the first to identify and explain a link. Following this, the other members of the team in observer roles, may question the link, provide a different link, or expand on the initial link. Students are encouraged to discuss their own point of view and provide rationales while respecting the opinions and experiences of other students. Students rotate to be the person who is turning a card and thus getting the opportunity to do the ‘Linking out Loud’ first.

As an example, two cards are placed face-up on the table. One is of a baby being breastfed, while the other image is oxytocin. One student’s response for this combination might be ‘the use of oxytocin for induction of labour may impact on lactogenesis, meaning additional breastfeeding support and hand expressing may be required’. Another student may expand on this point by adding ‘This is due to the synthetic oxytocin inhibiting the synthesis of endogenous oxytocin’. While another student may link the two statements together such as, ‘Oxytocin is responsible for the letdown reflex and milk ejection. This is due to the contractile nature of oxytocin working on the milk ducts within the breast’. In our experience, in subsequent classes on birthing complications in the following semester, one student commented on the risk between an induction of labour with oxytocin and the risk of postpartum haemorrhage. She followed this by describing the influence of the postpartum haemorrhage on breastfeeding. In this example, the sharing of knowledge and ideas strengthened the groups’ understanding of the physiological influence of oxytocin. This highlights the sharing of ideas as well as rapidly deducing care considerations from the two concepts. A student in second year may have a focus on breastfeeding establishment and the normal physiological process, while a third-year student may be able to deduce complex connections such as the latter response.

**Findings**
The ‘Linking-out-Loud’, nicknamed ‘LOL’ game has received positive evaluations from both second- and third-year students to date. Students appreciated the dynamic nature of the game and the sharing of ideas. They enjoyed the teamwork and found it interesting to hear how others would link concepts. Whilst established with midwifery student, this game can be modified to all health professions, and may be used as an icebreaking activity for interprofessional learning as this may encourage sharing of professional values and understanding. Linking-out-Loud is an easily adaptable, flexible and enjoyable way to develop critical thinking and the development of professional relationships.
Take Home Messages

- Critical thinking can be difficult to teach
- Gamification processes encourage interaction and create a fun learning space
- The Linking Out Loud game promotes declaration of knowledge and rationales
- The Linking Out Loud game promotes co-construction of knowledge
- The Linking Out Loud card deck can be used across all levels of learners

Notes On Contributors
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Declarations
The author has declared that there are no conflicts of interest.

Ethics Statement
This paper describes a teaching and learning activity and as such does not require ethics approval. No data were collected, analysed or reported.

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Davinder Sandhu
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This review has been migrated. The reviewer awarded 3 stars out of 5

The authors are to be congratulated on bringing in the concept of gamification in developing higher order cognitive function of critical thinking. The authors could have expanded more on educational theory directly linking critical thinking to clinical practice. Learning is the critical aspect and is a new way of doing things. Learning is not something done to students, but rather something students do for themselves. It is the direct result of how students interpret and respond to their experiences. Learning is enhanced by two critical elements of motivation and reflection which comes from self-determination theory. Clinical practice depends upon clinical reasoning which is the thinking and decision making processes. This leads to clinical thinking where knowledge; skills; observation and judgement informs patient management. The final path is to critical thinking which involves the analysis of facts to form a judgement, the ability to interpret argument, evidence or raw information in a logical and unbiased fashion. In other words the ability to solve complex problems effectively. That is where I feel the strength of gamification lies in problem solving.

Competing Interests: No conflicts of interest were disclosed.

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Shaoting Feng  
The First Affiliated Hospital of Sun Yat-sen University

This review has been migrated. The reviewer awarded 3 stars out of 5

This study shows us a novel approach to teaching critical thinking. I believe that the ‘LOL’ game can encourage interaction and create a fun learning space for students. However, it seems that the effectiveness of developing critical thinking though this ‘LOL’ game should be further studied and discussed.

**Competing Interests:** No conflicts of interest were disclosed.

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P Ravi Shankar  
American International Medical University

This review has been migrated. The reviewer awarded 4 stars out of 5

This is an interesting study. The authors have described the use of an interesting card game using the technic of Linking Out Loud (LOL). They have described the game and the process of playing it in detail. We had used a card game ‘Braincept’ among medical students and initial results showed an improvement in knowledge retention and clinical application. The authors mention that student feedback about the game was positive. They also mention that participants enjoyed the group interaction facilitated by the game. This is a preliminary evaluation and long-term studies may be required. I would be interested in knowing initial participant feedback about the game. As an additional resource the authors can add a video on how to play the game. I am not sure whether MedEdPublish in the current format can support videos but the authors can definitely add a hyperlink. The article will be of interest to a broad section of educators as with modifications the game can be used among medical, nursing and other health science students.

**Competing Interests:** No conflicts of interest were disclosed.

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This notion of employing elements of play in the learning context (gamification) offers alternative opportunities for facilitating learning. It is important that we engage thoughtfully with what these affordances bring and explore how they influence student learning. This article focuses on a gamification intervention adopted to promote ‘critical thinking’. An argument is made for the importance of critical thinking in the higher education context, while acknowledging that teaching such thinking can be difficult. In response, a game has been developed which is described as ‘an easily, adaptable, flexible and enjoyable way to develop critical thinking …’. While the game that has been designed does indeed sound innovative, and I can imagine that students would enjoy it, I do have further questions and suggestions for further investigation. For example, it would have been helpful to have been provided with a bit more information as to how the game plays out in practice. How many groups of five would there typically be in any particular session? Is the lecturer/teacher/tutor available to observe the process/provide guidance if the discussion goes off track? What happens if students are unable to identify the link? There is no doubt that sharing of ideas, hearing how others see linkages, and having to essentially justify one’s own thinking, ought to have value for student learning. I would, however, agree with earlier reviewers that further, follow up work would be important to strengthen the claims being made. As an aside, I specifically liked the idea of using something like this as an ice-breaker during interprofessional learning activities.

**Competing Interests:** No conflicts of interest were disclosed.
The topic is appropriate for medical education explaining the newer approach for developing a critical thinking approach in health science students. The abstract is accurate and well described in a concise manner. The introduction part is too compressed. More elaboration for the gamification theory should have been in the background with the justification of using this theory over and about other techniques for the group of participants. The methodology was well explained except how it was made sure that the two cards had a sort of connection or link. Maybe the two cards opened were not connected, so in that case what instructions were given to students. The focus should have been on the monitoring of the students; if they were linking it correctly. What if they got stuck at any point in time? It was highlighted in the aim that participants were students undertaking midwifery care program but the level or milestone of the participants was not highlighted. Where 1st, 2nd and 3rd-year students in the same group or different. The result of the study has not been represented. The finding of the study seems to be the conclusion of the study. I would love to know about what percentage of students appreciated the dynamic nature of the game prepared and identify the linking and sharing of information as per the displayed cards.

**Competing Interests:** No conflicts of interest were disclosed.

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**Trevor Gibbs**

AMEE

This review has been migrated. The reviewer awarded 3 stars out of 5

Although not a great fan of gamification, I did enjoy reading this paper and appreciated its novelty and its approach to active learning. My worry however, and this applies to this paper, is how much real value and effect we place on activities like this. I am sure that the students enjoyed the game and I am sure that somewhere in there, there was an increase in knowledge and possible clinical thinking. I do believe however that the real educational value can only be judged by evaluating the effect upon the students applied learning- does this apparent new learning and exploration lead to change (learning is about changing behaviour) and is this can this change be applied to real situations. I think that this is only the start of this piece of research and a follow up of students into their clinical years and later would add greater value to this work.

**Competing Interests:** No conflicts of interest were disclosed.