

## ORIGINAL RESEARCH ARTICLE

### Riddles on YouTube: Investigating the potential to engage viewers in reflective thinking

Petr Lebedev\* and Manjula Devi Sharma

*School of Physics, The University of Sydney, Sydney, Australia*

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Linear videos continue to be useful technologies for both formal and informal learning. The advent of YouTube has seen the rise of educational channels engaging millions of viewers informally, in the spirit of ‘lifelong learning’. This article investigates the potential of a particular kind of video to engage viewers in reflective thinking. The premise is that viewers, followers who find the channel worthwhile or interesting, should reflect, affirming or changing their answers. The channel Veritasium, with more than 5 million subscribers at the time of this study, posed four questions as ‘riddles’, and then a week later provided solutions. A survey appended to the solutions video was completed by 2220 respondents. About 16%–43% of respondents across all riddles indicated that their answer was correct or that they changed their answer, and 49%–73% reported to have changed their answers. The reasons for not changing answers were inductively coded for each riddle. The emergent categories were the same for the different riddles, from outward focused to inward focused, matching the types of reflective thinking in the extant literature. The responses illustrated how the riddles engaged the viewers in reflective thinking in this social media informal learning context.

**Keywords:** YouTube; reflective thinking; educational multimedia; informal learning; social media

#### Introduction

A variety of learning technologies are available and used for learning, ranging from interactive simulations, short linear videos and gaming to virtual reality. In science education, multimedia offerings with elaborate interactivity and feedback loops are used in formal settings to prompt reflective thinking with the intention of guiding learners’ understandings to those more congruent with current scientific understandings (see, e.g., Coller and Scott 2009; Crook, Sharma, and Wilson 2015; Stieff 2005; Wieman, Adams, and Perkins 2008). Contrary to the expectation that such interactive multimedia would dominate formal learning, linear videos in the form of lecture recordings (Yeung, Raju, and Sharma 2016), video slices with classroom-based learning cycles (Mayo, Sharma, and Muller 2009) and social media sites sharing short videos are providing fierce competition and

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\*Corresponding author. Email: petr.lebedev@sydney.edu.au

gaining popularity (Rosenthal 2017; Tan and Pearce 2011). Whilst YouTube channels such as ‘CrashCourse’ and ‘Khan Academy’ support formal learning through their links with curricula (Gray, Lindstrøm, and Vestli 2017), it is not unusual to find teachers using carefully selected videos from other channels such as SmarterEveryDay and Veritasium in their classrooms (CrookedScience 2019, pers. comm.).

Closer scrutiny shows such videos are often underpinned by sound pedagogical and andragogical principles, for example, aligning with Dewey’s phases for prompting reflective thinking which guides learners in developing their understandings (Dewey 1933; Rodgers 2002). Furthermore, specific design features could be used to engage learners. In this study, in one YouTube video, a question was posed, viewers encouraged to find solutions, and a week later, solutions with explanations were provided in another video. The questions and solutions are called ‘riddles’ and align with Dewey’s phases. Whilst the riddles are suitable for formal learning and are of the format sought by teachers, followers of the YouTube channel would be viewing these riddles as informal learning in the spirit of lifelong learning. Do the viewers change their answers? What is the nature of their reflective thinking? Reflective thinking amongst adults is multifaceted, captured by Mezirow (1998) in his taxonomy for reflective thinking for adult learners. The process of reflective thinking is integral to how one responds depending on the nature of the response.

Rosenthal (2017) summarises the behaviour of viewers who engage informally with science-based learning technologies as reasoned and planned. Viewers engage with YouTube videos for several reasons: They perceive their engagement as worthwhile as it satisfies a need; their engagement is enjoyable – arising from self-interest; or they are engaging to gather knowledge.

It motivates individuals to engage in the behaviour of seeking or following, potentially leading to reflecting and responding to messages. Such behaviour is found in adult informal education on subjects ranging from immunisation, patient information and parent driven campaigns, to sustainable agriculture (see, e.g., Bentley *et al.* 2019; Carter *et al.* 2017; Covolo *et al.* 2017; Pithadia *et al.* 2019). Given that YouTube videos used in informal learning can lead to reflection and action, it is important to understand viewers’ responses. The broad aim of this study is to investigate how effective riddle videos are at stimulating critical reflection as defined by Mezirow. The research questions of this study are specific for the individual riddles, from a set of four, presented on the YouTube channel, Veritasium:

1. Research Question 1: What percentages of respondents indicated that their answers were correct, they changed their answers or they did not change their answers?
2. Research Question 2: What are the reasons given by respondents for not changing their answers, thus elucidating the nature of their reflective thinking?

The next section of this article presents pertinent background on videos, in particular those on YouTube, as a learning technology, to improve reflective thinking from the perspectives of Dewey’s phases and Mezirow’s taxonomy for reflective thinking. The methodology describes the riddles on the YouTube channel Veritasium, data collection and analysis. This is followed by results and a discussion.

## Background

### *Linear videos: YouTube as a learning technology*

Each learning technology has its own affordance and challenges. Whilst technologies with feedback loops and interactivity can place the learner in control, prompting reflective thinking, and are underpinned by substantive research (see, e.g., Collier and Scott 2009; Stieff 2005; Wieman, Adams, and Perkins 2008), videos, at first glance appear limiting in being linear. On the other hand, films and documentaries, which are unlike videos, have been used for both formal and informal learning for nearly a century. Perhaps the forms of linear videos which are becoming standard in the adult education arena are lecture recordings (Gosper, Malfroy, and McKenzie 2013). Whilst there are doubts about the effectiveness of lecture recordings in supporting learning, lecture recordings provide easy access, connectivity and community through shared experiences of the opportunity for visiting earlier lectures (Yeung, Raju, and Sharma 2016). Sinfield (2018), in discussing mobile mixed technologies, argues that 'learning is a lifelong experience ... pedagogy is applied to communities and not just institutions; thus, ... part of this pedagogy becomes greater than the education system within tertiary institutions'. Linear video in its various forms constitute part of the pedagogy of learning in the lifelong learning endeavour, beyond the institution (Knox and Bayne 2013). Tan and Pearce (2011) in investigating free educational resources in their course, including carefully selected YouTube videos, found YouTube videos practical and reported that learners found them worthwhile and interesting. The connectivity between students and the wider world is captured through 'real world examples', for example, Liu and Elms (2019) used short animated videos, whilst Mayo, Sharma, and Muller (2009) used video slices. Such examples capture Dewey's (1916) pragmatic conception of learning as a social activity. Together with YouTube videos bringing 'real world examples' into formal learning contexts, pedagogies used in formal learning are creeping into informal learning, connecting formal and informal pedagogies, where, in the spirit of lifelong learning, pedagogy becomes greater than the education system (Knox and Bayne 2013; Sinfield 2018). In science education, examples are the YouTube channels SmarterEveryDay and Veritasium.

Pedagogically and andragogically, most educational videos on YouTube take the form of direct instruction (Jones and Cuthrell 2011), with little incorporation of feedback loops, registering audience responses and interactivity. This is partially due to the nature of the medium – YouTube does not include inbuilt interactive capabilities such as multiple-choice answers (Guo, Kim, and Rubin 2014). However, refutation, dialogue and Socratic dialogue have proven to be allies in the absence of inbuilt interactive capabilities (Muller *et al.* 2007). Some creators have taken this one step further by asking a question and encouraging viewers to write down their answers in one video, and then providing the solutions in another. This interactivity provides, in particular, time for reflective thinking in a forum where one is aware of and connected with like-minded others.

Dewey (1916) argued that learning is a social activity. In the modern day context, YouTube, being a social media platform, offers connectivity amongst like-minded individuals enabling learning as a social activity. Channels can attract millions of subscribers and hundreds of millions of views. According to Rosenthal (2017), the behaviour of viewers is reasoned and planned, their motivations falling into various categories; their engagement is worthwhile as it satisfies a need, is enjoyable due to

the contextual relevance and self-interest or their engagement is for entertainment or gathering knowledge (see, e.g., Bentley *et al.* 2019; Carter *et al.* 2017; Covolo *et al.* 2017; Pithadia *et al.* 2019). Individuals seek YouTube videos in line with their motivators, follow and subscribe, converging on and reinforcing their motivators. The behaviour of seeking or following whilst being aware of like-minded others who are socially connected via the channel can lead to reflecting and responding to messages. Even though the use of pedagogically sound, short linear videos on YouTube as a form of learning has increased in popularity over the last 10 years, research into their efficacy as educational tools is limited and under researched. Because of the importance of reflection and the impact of linear multimedia content both in classroom and informal settings (Dabbagh and Kitsantas 2012), it is worth researching how to encourage reflective thinking amongst the viewers of linear multimedia content.

### ***Reflective thinking and Dewey's phases***

In comparing reflection in a mirror with reflection in our thoughts, Wade (1997) eloquently articulates:

“As a mirror reflects a physical image, so does reflection as a thought process reveal to us aspects of our experience that might have remained hidden had we not taken the time to consider them.”

Taking time to discern what may not be obvious can lead to a change in behaviour, can bring an idea closer to application, and can commit one to action. (Boud, Keogh, and Walker 2013)

Since reflection emerges in several different fields, as noted by Rogers (2001), there are somewhat differing views on how it is defined. However, most scholars converge on and accept a few common features. These include that: reflection requires an experience that can leave the learner puzzled or perplexed, reflection is a process that requires active engagement with investment of time and allows for what may be hidden to become visible. These features imply that reflection is not linear, it is an organic, evolving and self-referential process. Rogers (2001) notes that:

The process of reflection does not always have a defined beginning and end. Thus, it should be viewed as continuous, much like an ever-expanding spiral in which challenging situations lead to reflection and ultimately to new interpretations or understanding. These new understandings may then lead to new challenges and additional reflection.

To study reflection as an evolving, complex and organic process through all these scenarios poses a challenge. Dewey (1933) makes the study of reflection more accessible by splitting up reflection into phases which further elaborate the common features.

- Reflection requires an experience, and the spontaneous interpretation of that experience.
- Reflection is a process that requires active engagement with investment of time involving:
  - the articulation of the problem or question that arises out of the experience
  - the generation of possible explanations for the problem or question
  - the explanations need to be examined and tested.

Dewey's elaborations are not dissimilar to others in providing a mechanism for constructing environments to promote reflection (see, e.g., Liu and Elms 2019; Mayo,

Sharma, and Muller 2009). These are non-linear, self-referential processes that can take on different forms, indicating that there are different types of reflection. Another reason why reflection is important is because it underpins critical thinking – it is one of the pillars that support critical thinking.

### ***Taxonomy of reflection***

When one writes a response after engaging in a formal or informal learning activity, what clues are there that they are reflecting? This study draws on reflective thinking in the field of adult education, in particular Mezirow (1998), who distinguishes reflection, as articulated above, from critical reflection:

Reflection does not necessarily imply making an assessment of what is being reflected upon, a distinction that differentiates it from critical reflection. Critical reflection may be implicit, as when we mindlessly choose between good and evil because of our assimilated values, or explicit, as when we bring the process of choice into awareness to examine and assess the reasons for making a choice. (Mezirow 1998, p. 186)

In making the assessment, Mezirow (1997) asserts that the viewers involve their own assumptions underpinning the reflection, a feature which is particularly evident in adult learners. The term Critical Reflection on Assumptions (CRA) is used when the objects involved in the experience are being assessed based on the viewer's assumptions regarding the presenter, the source, content and context – an outward focus. Critical Self-Reflection on Assumptions (CSRA), on the other hand, involves assessing one's own concepts, beliefs, feelings or actions in view of the experience. This could mean assessing one's own knowledge, emotions, or response – an inward focus. Both of these types of critical reflection involve analysing warranted or unwarranted assumptions pertaining to the experience. CRA focuses on the outward assumptions and CSRA focuses on the inner assumptions. This taxonomy provides a mechanism for ascertaining the nature of reflective thinking which can be applied in the social media based informal learning context.

## **Method**

### ***The riddles***

The videos used in this study were from the YouTube channel 'Veritasium'. Video 1 contained four riddles, and video two the solutions to those riddles (videos to be found at <https://www.youtube.com/watch?v=HgCXdNhVC1Q> and <https://www.youtube.com/watch?v=72DCj3BztG4&t=243s>). The videos align with the phases of reflection outlined by Dewey (1933). Video 1 captures Dewey's phases through an experience, posing a question, and the viewers generating possible explanations. Video two examines explanations and provides the solution – see Appendix for example.

### ***The survey instrument and data collection***

Video 1 was published on YouTube, followed a week later by video 2. The description box under video two contained a link to the survey hosted on SurveyMonkey®. The survey consisted of one question, containing two parts, duplicated for each of the riddles. For riddle one, the survey posed 'After watching the solutions video, did your answer to question (riddle) 1 change?' Respondents could only select one of the

following options, ‘Yes’, ‘No’ and ‘My answer was correct’. This part of the survey quantitatively allows us to answer the first research question. To answer the second research question, we asked another question. ‘If you answered No — why did your answer not change?’ The survey included a text box where the respondents were asked to write their answers. Figure 1 shows how the questions appeared to the viewer.

### **Data analysis**

The data from SurveyMonkey® were exported to an Excel spreadsheet and examined to determine if responses were ‘legitimate’. In particular, with the written responses, if a respondent gave an ‘obvious silly’ answer they would be removed. There were no such cases, and no data were removed.

Data were analysed with a mixed methods approach (Creswell and Clark 2007). Quantitative analysis – by counting the numbers of responses, converting them into percentages and thus generating graphs – was used for the first research question, whilst qualitative coding was used for the second research question. One researcher read the responses, immersing themselves in the data, identifying patterns and grouping responses in terms of similarities and differences. A discussion with a second researcher helped consolidate the patterns and articulate the descriptions of the initial categories. Both researchers then took these initial category descriptions and independently coded a random set of 50 responses for each riddle. In the next discussion, the two researchers further refined and finalised these category descriptions. All the responses for each riddle were then independently coded by the same two researchers. The two researchers compared the sorting of responses and made minor changes. Thus, the written responses were inductively coded through an iterative process of coding, comparing, consolidating and refining by two researchers (Burla *et al.* 2008). As a further check, a third researcher was provided with 50 responses from each riddle to code. The inter-coder reliability was (82.5%) indicating that the categories are robust, and allocation of responses to the categories is reliable.

### **Sample**

The videos attracted more than one million views each, of which 2220 completed the survey within a week following the release of video two. The sample of 2220 was those who engage with the popular science YouTube channel ‘Veritasium’ for

1. After watching the solutions video, did your answer to question 1 (mystery cylinder) change?

- Yes
- No
- My answer was correct.

If you answered No - why did your answer not change?

Figure 1. The survey, administered after participants had watched video two containing the solutions, was duplicated for each of the four riddles.

informal learning. At the time of this study, the channel had approximately five million subscribers and 500 million views. The respondents would most probably be adults who are lifelong learners of science. The study thus uses convenience sampling. Respondents are those who seek and follow channels; their behaviour is reasoned and planned giving us an interesting perspective on a range of questions, from what fraction say they are correct to why some ‘followers’ do not change their answers.

**Results and discussion**

The first research question probes the percentages of respondents who indicated that their answers were correct, they did change their answers or did not change their answers. Table 1 shows these percentages together with the numbers of respondents. It is worth noting that most respondents persisted in completing the survey for all four riddles. There is variation amongst the riddles; 73% of respondents to riddle one said that they did change their answer, whilst less than half did so for riddle four. Only 16% of respondents said that their answer was correct for riddle one, whilst the other riddles had twice as much or more. Whilst there are substantive shifts between the percentages of those who did change their answer and said that their answer is correct, the percentage of those who did not change their answer is within a narrow band of 7%–11%.

The percentages of respondents who indicated that their answer was correct ranged from 16%–43%, affirming their reasoned and planned connection with the channel. Noteworthy is the fact that a larger percentage, 49%–73% did actually indicate that they changed their answer – they responded and took action. Speculating, there could be a combination of reasons, such as the riddles being pedagogically sound, aligning with the phases of reflection outlined by Dewey (1933), prompting respondents to change their answers, and that the behaviour aligns with the seek and follow behaviour associated with YouTube channels. If we add those who changed their answers with those who were correct, we obtain a more consistent value of around 89%–93% across all riddles, supporting Rosenthal’s (2017) premise that engagement is perceived as worthwhile as it satisfies a need, is enjoyable and arises from self-interest or as a knowledge gathering exercise. In short, those who do not change their answer are a minority, 7%–11%.

Another prominent finding is that there is considerable variation from riddle to riddle. This variation exists even though all the riddles align with the phases of reflection outlined by Dewey (1933), despite the anticipated seek and follow behaviour of viewers. We offer the suggestion that the specificity of the riddle matters; it could be the topic, the way it is posed or the actual props used. Viewers who chose to complete

Table 1. The numbers and percentages of respondents who indicated that: their answer was correct, they did change their answer or did not change their answer to each of the four riddles.

	Number and percentage of respondents for each riddle			
	One	Two	Three	Four
My answer is correct	361 (16%)	695 (31%)	843 (38%)	962 (43%)
I did change my answer	1614 (73%)	1369 (62%)	1143 (52%)	1080 (49%)
I did not change my answer	245 (11%)	154 (7%)	229 (10%)	176 (8%)
Total	2220 (100%)	2218 (100%)	2215 (100%)	2218 (100%)

the survey connect with a community through shared experiences and respond in specific ways. They are sensitive to the experience posed in the riddle and its peculiarities; hence, their responses are nuanced. This is further borne out by the responses of those who chose not to change their answer.

Research question two focused on the respondents who had indicated that their answer was not correct, and yet, did not change their answer. Whilst this is a small percentage of the respondents, understanding their reasons gives clues as to why people seek and follow, and yet, not change their answers. Inductive coding of the written responses generated eight categories.

The percentages of responses in each of the eight categories for each riddle are shown in Table 2, those attracting more than 20% responses are shaded. Two points are worth making. First, the riddles attracted different percentages of respondents in each category. Second, the respondents did not respond in the same manner across the riddles, in other words, their responses fell into different categories for the different riddles. The descriptions and examples of typical responses are shown below.

In the first two categories, the respondents did not need to change their answers because they had no answer in the first instance or their initial answer was correct.

**I had no answer** was typified by the simple response, ‘I had no answer’.

**My answer was correct** contained responses such as, ‘I had it right’, and ‘I have done this problem before and knew the physics behind it’.

The responses were generally brief, but they diligently completed the survey. These two categories attracted the smallest percentage of responses, 8.5% for riddle one and, the largest, 48.2% for riddle four.

The next three categories were premised on the assumption that the respondents have adequately analysed the science in the videos. They had an alternative solution or the science in the solution video was close enough to the science in their answer, hence the respondents did not need to change their answers.

**I have an alternative solution** could contain creative alternatives, such as, ‘I still believe my answer (a cylinder with a fluid and a baffle with a few small holes) could exhibit the same behavior’. In other words, there is more than one solution to this problem. Sometimes a simple statement was provided, such as, ‘Because I have a different explanation to the same problem’.

Table 2. Percentages of those who did not change their answer, coded into each category for each riddle (shaded in grey if higher than 20%).

Category	% of responses for each riddle			
	One	Two	Three	Four
I had no answer	7.3	9.7	11.7	26.8
My answer was correct	1.2	15.3	18.8	21.4
I have an alternative solution	22.0	0.0	10.2	12.5
My answer was almost correct	24.5	5.6	1.5	4.5
My answer was almost correct, with explanation	28.2	20.2	4.5	5.4
I am discontented	12.2	24.2	26.9	8.0
I don't fully understand	1.6	16.1	20.8	17.0
Miscellaneous	3.0	8.9	5.6	4.4
Total	100	100	100	100

**My answer was almost correct** contained simple and direct statements, for example, 'I was somewhat correct'.

**My answer was almost correct, with explanation** contained explanations which often demonstrated a level of prior knowledge or that the respondent was drawing on some first-hand experience:

I answered a viscous liquid. I don't think the ping pong balls played a fundamental role, since the jar of honey behaved in a similar way.

I did not predict the ping pong balls but was mostly correct. The ping pong balls seem to affect the cylinder mostly by keeping the air in two spheres which changes the weight distribution but it is still a viscous liquid with an air pocket.

In these three categories are those who indicated that they had alternative solutions or their answers were close enough, often times offering an explanation. Generating possible explanations is a common feature of reflective thinking, as is examining and testing explanations (Dewey 1933; Rogers 2001). The focus in these reflections was on the content of the experience, appropriateness of the science used to interpret the experience and rationale for the solution provided. These responses indicate that they are premised on the assumption that the viewer had adequately assessed the science in the videos, placing them in Mezirow's (1998) CRA category. The respondents are critically reflecting on the experience, its credibility, plausibility and authenticity. The respondents are doing this by comparing their answers to the solution provided, reflecting on the validity of the solution and critically reflecting on the presenter, source, content and context. There is a comparison between their answers and the answer provided; the answers could be affirming, close enough, explanations generated, alternatives provided. The important aspect is that these reflections are outward focused, the object is external, the riddle. Collectively these three categories attracted the smallest response, 16.2% for riddle three and, the largest, 74.7% for riddle one.

In the next two categories, the respondent is more involved, emotions are invoked, questions are raised and beliefs are in play. These could be positive or negative. There could be disagreement or that they did not fully comprehend aspects of the riddle or know relevant detail, expressing what they had learned from the video or intended to learn. Often they could identify flaws in their own reasoning or gaps in prior knowledge, or in the solutions.

**I am discontented** often noted specific features of the video which respondents felt were incorrect or they disagreed with such as, 'I disagree that the solution uses a reasonable interpretation of the question'. Another example is 'One component of a bike was forgotten, the ratchet on the back wheel. If your bike doesn't have one, and you pull with less force than the traction ... but the back wheel won't spin backwards'.

**I don't fully understand** contained examples, such as, 'I still don't fully understand the mechanics of bicycles. Need to re-watch the video again'. Another example is, 'I predicted the bike behaviour correctly, but my explanation was partially wrong ... the net force points backwards, therefore the bike will move always backwards.'

The category '**I am discontented**' is interesting as the reflection is again on the technicalities of the experience and its interpretation, but a discrepancy is articulated. There is a sense that something is missing or unfair; the respondent sometimes expresses feeling tricked or articulates that they had not expected this from this particular channel. There is discord or discontent, and emotions are involved. The category

'I don't fully understand' contains responses which are not only reflections on the technicalities of the experience but also contain viewers own thinking. It is also of note that most respondents expressed an interest and intent to learn more about the topic, aligning with lifelong learning aspirations. Both of these categories align with reflective thinking in that they are examining and testing explanations (Dewey 1933; Rogers 2001). In addition, the reflections pertain to the validity of one's own concepts, beliefs, feelings or actions. There is an inward focus, falling into Mezirow's CSRA. Collectively these two categories attracted the smallest percentage, 13.8% of responses for riddle one and, the largest, 47.7% for riddle three.

Finally, 3.0%–8.9% of the responses were coded as miscellaneous; these responses could not be meaningfully coded.

**Miscellaneous** contained responses that were ambiguous or unclear and were not coded.

### *Implications for theory and practice*

In this study, the structure of the videos aligns with Dewey's phases of reflection (see Appendix), and affirms Dewey's framework in the social media, informal learning context. Another important consideration for the practice of creating videos that encourage reflection is that riddle matters – there are variations in the types of reflection between the four riddles. Focusing on the shades of grey, for riddle one, the second set of categories encompassing the outward focusing CRA dominates, whilst for riddle three, the inward focusing CSRA dominates. This leads to interesting questions for further research. How does the nature of the riddle affect the type of reflection? What we found was that none of the respondents could be consistently placed in the same category for all four riddles; participants changed their responses based on the riddle.

Given the increasing popularity of YouTube videos and other such resources to complement, supplement and enrich the lifelong learning experiences of those who engage informally, it is important to understand reflective thinking as the response can lead to action. Being opportunistic in nature, this study needs to be repeated in different contexts with different riddles. Our sample is specific to those who engage with the particular YouTube channel, and also the subset who chose to complete the survey. Nevertheless, the sample is sufficient to indicate that some reflection is occurring, and the responses align with Mezirow's taxonomy and behaviours of respondents align with what is expected for those engaging with YouTube (Rosenthal 2017). Further research needs to be conducted on different samples, with different riddles, and different subject areas.

### **Conclusion**

The reach of social media such as popular YouTube channels is captured by the sheer numbers of individuals who engage with them, more than one million within a fortnight for our study. The numbers who diligently engage, often in the spirit of lifelong learning, is particularly noteworthy. In our study, 2220 viewers completed the survey for all four riddles, providing unique answers for each riddle. The vast majority self-reported that their answers were correct or they had changed their answers, affirming their answers or prompting them to change. The responses provided by those who did not change their answers fell into categories corresponding to Mezirow's (1988)

critical reflection categories for adult learners. In short, viewers who follow this particular social media YouTube channel as part of a reasoned and planned behaviour appeared to be critically reflecting as a result of engaging with the riddles. Investigating YouTube as a learning technology for formal and informal learning is justified by the scope and reach as well as its potential impact.

The unique feature of this research is that it investigates known pedagogical and andragogical perspectives on reflective thinking, and applies them in the domain of informal, social media facilitated learning. Whilst more research needs to be carried out in this context, the initial results from this study are promising – Dewey's phases of reflection and Mezirow's taxonomy of critical reflection are useful tools for encouraging and analysing reflection, which happens in the informal learning context.

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