Experiential Learning and Peer Teaching to Develop PowerPoint Slide Formatting Skills

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Abstract. Construction of visual material to enhance audience understanding of an oral presentation is an important skill in educational and professional settings. Many first-year undergraduates may not be familiar with the basic principles of effective slide design to increase audience understanding. However, faculty face time pressures to train students on effective use of information technology for educational activities. This paper reports on the development and use of a time-efficient, engaging, in-class activity involving specific learning criteria for slide design in an academic literacy course. The activity is based on experiential learning and peer teaching to increase student ability and confidence with creating PowerPoint slides for first year undergraduates. Students evaluated the activity positively and were able to achieve most of the learning criteria. Recommendations for further development of the activity are provided.

Keywords: Oral presentation, PowerPoint, experiential learning, peer teaching, undergraduate

Oral presentations skills are a key aspect of achieving professional competency across a wide range of contexts. Communication skills are a valued component of many graduate profiles in higher education (van Ginkel et al., 2015) and a significant aspect of academic life (Barrett & Liu, 2016; De Grez, Valcke, & Roozen, 2009; Živković, 2014). Oral presentations are included in assessments of many undergraduate courses as a desirable skill set in terms of thinking and communication. One of the key skills is to connect verbal information with visuals (Aryadoust, 2015). In professional oral presentations, presenters frequently include communication through visual forms such as slides. Furthermore, the increasingly multimedia rich world will require communication skills beyond the current dominance of the written word in essay form that characterizes current university practice (Mitchell, 2012).

Despite the recognized importance of oral presentations, students are given limited training in how to do them (Andrews & Higson, 2008; Jones, 2003). An oral presentation is a multi-skill activity that takes time and experience to develop. In addition, this can be frustrating and nerve-wracking for students who are not native speakers of English (Aryadoust, 2015; Barrett & Liu, 2016), or those with little experience of, and who fear presenting and may disengage from presentation activities. Therefore, a focused and manageable subset of skills for presentations can be useful within such contexts to quickly develop engagement, skill, and confidence. Students benefit from focused learning with specific guidelines (Barrett & Liu, 2016) and such guidelines assist staff to focus their instruction and assessment activities within available time allowances.

There are several options for slide software such as PowerPoint, Keynote, Prezi, SlideShare and Adobe Spark. Although the use of PowerPoint has become extremely common, critics report the constraints of information into titles and bullet points as a restriction to creativity and other forms of knowledge presentation. Furthermore, that such presentations perpetuate monotonous and ritualistic presentation formats (Kernbach, Bresciani, & Eppler, 2015). Despite criticisms of PowerPoint, it offers an easy-to-use tool that introduces users to the basic principles of working with visual communication. Thus, instead of attempting to propel early adopters into cutting-edge experience with newer and emerging slide tools, students can build skills and confidence in a time-efficient and measurable way that enables new undergraduates to master the basic principles of slide design with PowerPoint software. Furthermore, with PowerPoint being a commonly used tool for current students, academics, and industry professionals, then being familiar with this format can be considered a starting point from which later development into more creative and non-text-based formats of presentation can launch. Another advantage of PowerPoint is the ease of uploading slides to common learning management systems, such as Blackboard or Moodle for assessment and to have them all located in one place on the classroom computer for each presentation session. In addition, with many people being familiar with PowerPoint, there is a greater pool of potential help by friends and family outside of the class.

In this article I will describe some challenges with teaching introductory slide design and combine two effective teaching strategies of experiential learning and peer teaching into an experiential slide design activity. Following this is a description of the local context in which I developed and applied a slide design activity using experiential learning and peer teaching to fit within a single class period. Student perceptions of their engagement, learning and perceived usefulness of this exercise are presented along with their suggestions for improvement. Teacher evaluation of the students' slides is also presented. This article will be useful for educators and/ or students who require an effective, time-efficient learning activity for designing slides with specific learning outcome criteria for assessment.

Challenges with Teaching Slides

Time

Limitation of time is a concern for both teachers and students. Performance elements of presentations such as vocal variety and body language need practice physically. Designing slides is also performative in that it includes the creation of an artefact mediated by technology and requires physical manipulation of digital objects and an awareness of how their placement affects audience learning. However, educators often do not have time to teach presentation skills (Barrett & Liu, 2016). van Ginkel et al. (2015) summarized research pointing out the challenge of offering sufficient opportunity for skill development within increasingly tight time constraints within higher education. Restricted time also reduces the amount of individualized instruction the teacher can provide. Although there are many resources available on how to design slides (e.g., Duarte, 2008), students may not have time to access or prioritize these skills. Student lack of time has been noted as an issue for study (Eriksson, Adawi, & Stöhr, 2016). Thus, instead of

developing their design skills, students and educators may rely on what they know of writing for other formats and apply these to their slides (e.g., presenting large chunks of text). This may enable them to 'get by' without spending additional time.

Clarity & Consistency

Educators need to make explicit what outcomes the students will be assessed on and how to achieve these (Biggs & Tang, 2011), so students know what is expected of them and how these skills will apply after graduation from undergraduate tertiary study (National Institute for Learning Outcome Assessment, 2016). In courses with large enrolments, several markers may assess students, some of which may not be teaching on the course. Therefore, a clear set of requirements for consistency in grading is important for consistency. This is particularly important when marking rubrics, constrained by limited space, describe the requirements for slides vaguely as "appropriate" or "enhancing" visuals without specifying what these terms mean. Furthermore, clarification of how to reference images is also important to respect copyright (Jones, 2003) and academic referencing conventions.

Unfamiliarity with Slide Making Software

A barrier to using slide-making software may be the reluctance of those slower to adopt technologies (Jones, 2003). This reluctance may be irrespective of age and therefore includes young as well as mature students. Jones stated one of the benefits of using PowerPoint was the ease of achieving basic-level proficiency. However, the downside of this is the tendency for educators to use slides as notes and to reproduce large chunks of text in lectures (Jones). Such examples may have influenced students to imitate a similar design. I have noticed the excessive use of text by my students when they appear to use their slides to reproduce their essay and serve as cue cards for themselves rather than as a method to enhance the audience's understanding of their topic. I have heard students make similar comments about their lecturers. Although people can get by with this practice, Brock and Joglekar (2011) found higher teaching effectiveness was rated by students as connected to less text on slides.

Spending focused and structured time on presentation skills is beneficial for students who are required to acquire a presentation skill set. Incorporating slides into a presentation proceeds in three phases: planning, design, and delivery (Mollerup, 2014). During the design phase, students need to consider how to select and arrange key content on a slide to enhance the communication of that content. The proposed activity in this paper focuses on the design phase.

Effective Teaching Practices

Experiential Learning

According to constructivist views of learning, students construct knowledge through engagement with activity (Shuell, 1986) and activities need to align with the

required learning outcomes (Biggs & Tang, 2011). Many skills required for oral presentations require active experience to support deep level learning. If students are expected to engage with an activity on developing their slide design skills, then it needs to be a performative activity, narrowed to an achievable set of skills that aligns with the learning outcomes and can be covered in the time available. Proponents of experiential learning argue that people learn more effectively through experience and reflecting on that experience. In doing so, students engage more of their senses for processing information (Jacobson & Ruddy, 2015; Kolb, 1984). A combination of experiential techniques and more direct instruction is recommended to assist students with little prior knowledge of a task (Lalley & Miller, 2007).

Beard and Wilson (2006, 2018) viewed learning as holistic and so the space, emotions, senses, and levels of challenge are important when designing learning experiences. Learning occurs through the interaction between the learner's inner world and outer world using their senses. Bodily movement, social interaction, language, and building things support learning. The opportunity to talk aloud while building something stimulates thinking and a sense of reality. Therefore, Beard and Wilson (2006) recommended several elements for experiential learning such as: a clear target of learning, progressive learning journey, exercising intelligences, reality-based, social collaboration, restricted scope, challenge/risk, time limits, and an opportunity for reflection.

Peer and Self-Assessment for Reflective Learning

In a review of studies, Marton, McCullough, and Ramnanan (2014) found peer teaching led to increased confidence in teaching, oral presentation skills and giving feedback. Sociocultural views of learning highlight learning through social interaction and language within context over disconnected information transmitted from a teacher. Examples of this view are shown in Vygotsky's (1978) conception of the Zone of Proximal Development (ZPD) and Lave and Wenger's (1991) concept of the Community of Practice (Campbell, MacPherson, & Sawkins, 2014). Ramaswarmy, Harris, and Tschirner (2001) recommended that teachers play an active role during peer teaching session as they can identify aspects that have been missed and recognize student progress.

Local context and aims

Healthcare workers need to learn to teach others, including their colleagues and patients with their families. Peer teaching is common in health education and assists in the development of this important skill (Marton, et al., 2014). In a core academic literacy course for first year Health Science students in a large, publicly-funded university in New Zealand, one of the assessments is to write a 1250-word academic essay on a topic of their choice. A subsequent assessment is to make a five-minute verbal presentation of their essay, accompanied by six PowerPoint slides. Six slides encourage conciseness and consistency for the assessment artefact. Thus, the oral presentation component is integrated within the academic literacy course rather than being a stand-alone presentation course. Competence in

the oral presentation is required to pass a learning outcome of "producing written and verbal work at an appropriate academic standard", of which "using visual aids to enhance the presentation" is a criterion. Another assessed learning outcome requires academic integrity in which students must correctly reference any text or images used from other sources. Students must meet the oral presentation standards to progress in their studies.

The aforementioned course was run in a flipped classroom format in which lecture content was viewed online prior to attending a 90-minute weekly tutorial in a class sizes of approximately 20—40 students (Overall enrolment ranges from 350—1500 students of considerable age and ethnic diversity). There were two class periods focused on the oral presentations: one for creating slides and the other for the presentation delivery skills. Prior to the slide creation tutorial, students were required to watch a five-minute online video on slide creation that included information on: content conciseness, font type and size, background selection, contrast, animations/distractions, selection of informative images and proofreading. The follow-on in-class activity required students to view and critique three examples of previous students' slides. However, there were several problems with our approach to teaching students how to design effective PowerPoint slides in this way. Despite the instructional video and in-class examples, teachers noticed that many students did not appear engaged as very few students would offer critical comments in class. Furthermore, during the oral presentation assessment, we saw several slides containing cut and pasted blocks of text with little attempt at formatting or selection of informative images to increase audience understanding. Although most students created slides that could pass as adequate, we believed they could achieve higher standards. We also realized that despite the young age of many students, several were not familiar with designing slides and this was also the case for mature students returning to education. Our marking rubric was also vague and offered little to guide student learning as it stated, "visual aids well prepared, managed and appropriate for presentation".

Considering these characteristics of our students and the non-specific wording in the marking rubric, the tutorial needed a more engaging activity that would involve all students rather than just those who volunteered answers. We also realized that much of our knowledge on good design was tacit and varied across instructors. Therefore, we needed to narrow our assessment criteria to a manageable set of specific design principles and make our knowledge explicit to students and consistent across assessors. We also needed students to be more aware of how the design principles increase understanding. To achieve these goals, the author designed an in-class activity based on the principles of experiential learning and peer-teaching that students could engage in and help learn more about the design criteria. There would also be an opportunity for reflection on their learning. Ethical approval was obtained through the university's ethics committee.

Method

Recruitment

Immediately after students completed the learning activity, the teacher stepped out of the classroom. A staff member external to the class introduced the study and offered students the opportunity to participate by completing an anonymous survey about their learning.

Activity Design

Based on the experiential learning program elements outlined by Beard and Wilson (2006, 2018), and considering the recommendation to include some direct instruction, the activity includes the following elements:

(1) Target – Create a clear slide to enhance communication of the provided information.
(2) Journey, construction, organizing and functional skills – Progression from selecting, and physically formatting and positioning text and images to create the slide using PowerPoint.
(3) Exercise intelligences and senses – Achieving the goal through talk, touch, thinking and social interaction.
(4) Reality – Create an actual slide following the guidelines that also form the basis of assessment in the coming assessment.
(5) Social collaboration – Working in pairs or threes (or alone if preferred).
(6) Restrictions – Set of guidelines provided to assist with slide construction.
(7) Challenge/risk – Making the slides available for the class to view and compare. Deliberate typos included in the text and inclusion of non-informative (cliché) images.
(8) Time constraint – 10 minutes to construct the slide.
(9) Reflection – Comparing their slide with those of their peers.

Materials and Steps

Questionnaire. The slide creation post activity survey included five sections: 1) demographic questions on sex and age, 2) questions on how students experienced the activity according to the experiential learning dimensions (rated on a 5-point scale), 3) questions on to what degree students believed they had learned the 11 slide formatting techniques in comparison to what they knew before the activity (rated on a 3-point scale of: "same as before", "a little better than before", and "a lot better than before"), and an open question box to write what they perceived they had learned most 4) an overall rating of engagement with the activity from 1 (not at all) to 10 (very), and 5) an open question on any suggestions for improvement of the activity.

Teacher observation sheet. I created a teacher observation sheet to make three key observations: 1) whether students were looking at their laptop screens displaying the activity, and 2) whether students were communicating with their peers (or focused on task if doing the task solo). I used a white box in the center of the sheet to sketch the student groupings and locations in the classroom. I made five observations of the students in each class.

The author noted on a printout of the format guidelines for slide layout given to students whether the slide created by the individual, pair or group had achieved the learning outcomes.

Laptops and computers. Students require laptops or computers for this activity. If a student does not have a laptop in class, they can work in a pair with someone who does; otherwise this activity could be completed in a computer lab or at home. Tablets or mobile phones are not effective for this activity as the screens are too small and it is difficult to manipulate text and images. The following procedure outlines the steps required to set up the activity in class.

Preparation

STEP 1. Consider the learning outcome(s) the slides are associated with and list the observable criteria required to be demonstrated. For example, the outcome of facilitating understanding may include easily readable font size (24 or greater) and type (Arial, New Times Roman or Calibri).

STEP 2. Display these assessment criteria in a format guide for students to work with (either as a handout or electronic version). This becomes the checklist for feedback to students. For a useful set of presentation design guidelines, see Jones (2003) and Duarte (2008). Table 1 shows the guide used in the current study. Although sans serif fonts are most advised, we allowed Times New Roman to be included in the suitable font to reduce the complexity for beginning level students. For flipped classroom formats these criteria are covered in an online video that students are expected to watch prior to attending class.

Table 1

Formatting Guides for Slide Layout

Format	Includes the use of:
Good background	Text that contrasts strongly with the background
Appropriate font size	24 or larger for body text
Appropriate font type	Easy to read types – e.g. Arial, Times New Roman or Calibri

Appropriate title	Keywords appropriate to the content
Amount of text	One point & not too cluttered
Relevant picture(s)	Images that increase the understanding of text
Text hierarchy	Titles and subtitles in larger font than the body text
Reference the picture(s)	Small font citation under the image
Resize objects in PowerPoint	Resize option to make objects an appropriate size
Avoid distracting items & animations	Animation only if it enhances understanding & do not use items that do not enhance understanding

STEP 3. Collect or create text appropriate for the course level (reading level and content) and adapt it so students are required to edit it to achieve the learning goals. For example, if a goal is accuracy, then include errors. If a goal is conciseness, then include more text than necessary. The text may include titles, subtitles, or body text.

STEP 4. Collect or create images suitable for the learning goal. If visual images are required, then provide choices between informative images (pictures that add understanding to the text) and cliché images (pictures that do not add further understanding). For example, on the topic of physical rehabilitation using water therapy, an informative picture could show a therapist working with a client in a pool. A cliché picture would just show a pool.

STEP 5. Develop a practice content slide by placing content information and images.

Practice content slide. Figure 1 shows the content elements which include: suggested keywords for a possible title, enough sample text so that some could be deleted, deliberate spelling mistakes for proofreading, images that either illustrate points made in the text (e.g. an instructor working with a client, or instructions on equipment) or are cliché (e.g. the general gym scene, dumb-bell or dumb-bell lifter in Figure 1). Pictures will need deleting or resizing, and the font type and size will need to be changed.

Figure 1. Content elements slide.

STEP 5. Following the content slide, include a blank slide for students to transfer content and images (optional use).

STEP 6. Develop a set of instructions for students to follow. In the current study the instructions were:

In the next ten minutes, you can work alone or in pairs or threes on your laptops to create one body slide to illustrate some information contained in this content slide. You should include a title, some text and at least one image. You do not have to use all the material here. Use the keywords to get ideas for the title. You may resize, move, or delete anything on the slide. At the end of the ten minutes, we will move the screens to face the center of the room to form a gallery and we will look around at what others have done. Any questions?

STEP 7. Embed the activity content slide and blank slides into student versions of the overall lesson slides, or save as a separate file for students to download and work on.

Activity in Practice

The steps here were completed in 25 minutes with a class attendance of approximately 15 students per class. Time could be adjusted for varying class sizes.

STEP 1. Setup - Have students sit with their laptops or arrange themselves in pairs or threes with a laptop to share. They open the file with the practice content slide and blank practice slide (3 minutes).

STEP 2. Instructions - Give or read the instructions to students to begin the activity and answer any questions (2 minutes).

STEP 3. Feedback in process - During the activity, move around the students to answer any questions, check progress, and offer guidance (10 minutes).

STEP 4. Feedback after activity - While the last students are finishing their slide creation, the teacher starts giving feedback on each slide as to whether it met the requirements described in the formatting guide. Continue until all students have received feedback (5 minutes).

STEP 5. The gallery exhibition - At the conclusion of slide creation and teacher feedback, the students position their laptops on the desks to form a circle of screens facing the centre of the room. This arrangement forms the gallery. All students then move around the gallery looking at the differing versions of the slides. As students move around the gallery they compare the slides and notice what they liked about the content choices and formatting of their peers. The teacher can also direct students' attention to good examples of formatting and content choice (5 minutes).

STEP 6. Evaluate the activity and use the feedback to develop further context-specific iterations.

Analysis

Analysis of the quantitative data from the questionnaires and teacher observations included calculations of descriptive statistics. A selection of qualitative responses offered further illustration of findings using the students' voices.

Results

During the activity, teacher observations recorded that students focused on the activity during the allocated time or until the task was completed. Following the activity, 76 students completed an anonymous in-class survey. This represented

41% of my class enrolments and 100% of students completing the activity in my classes. The majority of the participants were female (59.2%, male, 34.2%, no response, 6.6%) and under 20 years old (42.1%, 20–24, 30.3%, 25+, 23.7%, no response, 3.9%). The average rating of engagements was 8.5 out of 10 (standard deviation = 1.3, mode = 10). Table 2 shows the average and modal responses from 1 (negative) to 5 (positive) for each of the experiential learning characteristics.

Table 2

Average and Mode for Each Experiential Learning Characteristic

Experiential Learning Characteristic	Average	Mode
Clear goal	4.7	5
Clear process	4.6	5
Use of physical action	4.6	5
Use of intelligences	4.3	5
Task based on reality	4.8	5
Social collaboration	4.5	5
Set of rules	4.5	5
Challenge	3.2	3
Time constraint	3.6	4
Opportunity to reflect	4.5	5

Table 2 shows students perceived most of the experiential learning characteristics as positive. Students rated the time limit and level of challenge less positively. Teaceher observations noted approximately half the students completed their slide (59%), and the remaining students were near completion at the end of the allocated time. Social collaboration was rated by 63 students as the others worked alone. Table 3 presents the percentages of student evaluations of their learning in each criterion, falling across three levels of learning on the scale of 1 (same as before), 2 (a little better than before) and 3 (a lot better than before). There was only one missing value for the ratings of font size and relevant picture.

Table 3

Percentage of Students Reporting Each Degree of Learning per Learning Cutcome Criterion

Learning outcome criteria	Degree of perceived learning			Chisq	*p*
	Same	Little better	Lot better		
Reference picture	4	20	76	66.0	<.001*
Relevant picture	16	28	55	19.0	<.001*

Avoid distracting items	25	28	47	6.82	.03*
Amount of text	16	33	51	14.4	<.001*
Make a slide to enhance understanding	3	54	43	33.5	<.001*
Font size	21	37	41	5.0	.08
Title using keywords	22	41	37	4.3	.12
Text hierarchy	34	30	36	.34	.84
Font type	37	28	36	1.1	.57
Contrast between text & background	39	30	30	1.3	.50
Resize objects	47	22	30	7.5	.02*

p=<.05

Table 3 shows nearly all students (97%) reported the activity helped them a little or a lot better than prior to, in making a slide to enhance their understanding. At least half the students reported learning a little better or a lot better than prior to, for all learning outcomes and in particular, for the learning outcomes of: referencing a picture (96%), the amount of text to use (84%) how to select a relevant picture (82%) and the avoidance of distracting items (73%). A Chi-square goodness-of-fit test was performed with two degrees of freedom per test. The distribution of the responses in these five learning outcome criteria reached statistical significance. In addition, the proportions of responses for resizing objects also reached significance – in this case for nearly half of students reporting their knowledge of resizing objects was the same as prior to the activity.

At the conclusion of the activity, the teacher assessed whether the students had achieved the specified learning outcome criteria. A total of 43 slides were assessed across the six classes. Table 4 shows the percentages of slides achieving the formatting requirements at the conclusion of the task.

Table 4

Percentage of Slides Showing Degree of Each Learning Outcome Criterion

Format	Achieved	Partially achieved	Not achieved
Background contrast	95.3	0.0	4.7
Text hierarchy	95.3	0.0	4.7
No distractions	95.3	0.0	4.7
Appropriate title	90.7	7.0	2.3
Font type	86.0	7.0	7.0
Font size	79.1	14.0	7.0
Relevant picture	74.4	9.3	16.3

Text amount	67.4	23.3	9.3
Picture reference	65.1	9.3	25.6
Resize objects	39.5	25.6	34.9

Table 4 shows most slides included acceptable background contrast, picture referencing, absence of distractions, an appropriate title, and font type. Achievement dipped below 80% for the other criteria. Resizing objects was not frequently achieved as many students did not resize, or only marginally increased the size of the image.

During the reflection gallery, I observed students commenting to each other on what they liked about the other students' designs. From the open questionnaire item asking students what they had learned from the activity, most referred to an aspect of creating slides. The following response illustrates this:

> To review the slide drafts, I have made to make images more relevant and strongly connected to the words. To review font sizes so same over whole [slide] deck. (Student 50)

A few other responses mentioned the awareness of the audience when constructing slides. For example:

> I learnt how to summarize key points, and that pictures are important in getting a message across to the audience. (Student 5)

Others mentioned how the guideline gave them an idea was what standard was expected. For example:

> [I learned] what was required of the upcoming assignment, which was useful as now I am much more confident. (Student 1)

Few students made suggestions for improvement, but those who did offer ideas mentioned: doing the activity with a slide they would actually use for an assessment, using a computer lab, having more time, having a little more instruction at the beginning, design more slides in the activity, practice presenting the slide, and to have an example of a 'good' slide at the end.

Discussion

Engagement

The average rating of engagement was high (8.5/10). This rating indicated that the students perceived the activity as matching the characteristics of experiential learning described by Beard and Wilson (2006) and students found it engaging. Thus, the current form of the activity appears to have worked well. This was an improvement on the previous passive critique of example slides during class in which only a few students actively participated. Furthermore, the class activity

aligned more closely with learning outcomes for the course. This offered more clarity of expectations for students (Biggs & Tang, 2011).

The two aspects of the activity receiving the lowest ratings were the level of challenge (3.2/5) and the time limit (3.6/5). Even though the challenge rating was moderate, the learning benefits reported by students for the other criteria suggest this level of challenge is appropriate. High engagement can be achieved when people use their skills to work on a manageable challenge (Csikszentmihalyi, 1997). If the challenge rating is too high, then some people may give up. The challenge rating here may also be due to the basic nature of the slide design principles, which are easy to understand and consciously perform. Educators will need to assess the competency level of their students when deciding what criteria to include in the activity and when to increase the level of difficulty and associated challenge.

The time limit was slightly restricting in that some students had not quite completed their slide. An additional five minutes to complete the task may be helpful. Educators also need to be mindful of time allowances that enable most of the task to be completed by all students – if too much time is given, students who complete the task quickly may become disengaged. Alternatively, faster students could be given an additional task while waiting, such as working on a slide they will use for a future presentation.

Learning

Most students felt their understanding of how to make a slide to increase audience understanding had improved, particularly in the aspects of: referencing pictures, selecting a relevant picture, selecting an appropriate amount of text and avoiding distracting items. Students achieved high levels of success (approximately 80% or higher) for six of the design principles, and moderate (above 65%) for the others. The criteria perceived improving the least were: resizing objects, contrast between text and background, and font type. Although more than 50% of students reported learning about these criteria at least "a little better than before", it is possible that these principles take a little longer to master for some students than one class. Students may have to unlearn habits of using larger amounts of text and copying images without referencing them. Although the Chi square test showed statistical significance for six of the learning outcomes, it was based on the assumption of expected frequencies of one third in each response category. It is unlikely that many students would randomly say they had learned a lot in an activity when they had not – as they did not do so for resizing an object. Thus in practical terms, even though some learning outcomes did not achieve statistical significance in this case, the relatively large percentages of students reporting some gain in knowledge about the learning outcome warrants inclusion of those outcomes.

Although students reported learning the least from resizing objects, the least achieved skill was resizing objects (only 39.5% of slides were deemed to achieve this). Resizing objects was seen as something nearly half the students felt they did not learn more than what they knew before and yet this was the least achieved item. Students may have considered the concept of resizing images to mean the

physical manipulation of the images to change their size, rather than understanding the concept of white space and a greater awareness of what is visible to people at the back of the presentation room (similar to understanding choice of font size).

The current list of criteria appears suitable for this student group. There were a number of skills that were achieved well and other skills that could still be improved. The number of skills was enough to provide just-in-time learning and just enough for their assessment. This is useful when mastering technology skills (Jay & Conners, 2005). In addition, students receiving time to immediately apply the information after the brief instruction period facilitates their ability to remember and perform the skills, which in turn provides them with established associations they can connect future learning with (Klemm, 2010).

If student cohorts become more proficient in future, extra criteria could be included to advance the skills of the more proficient students, such as: adding hyperlinks to break up the liner flow of the presentation, strategic use of animation to highlight points or control reading (e.g., revealing one line of text at a time), or as Jones (2003) suggests, choosing slightly less contrast between text and background to assist readers with dyslexia. However, this needs to be carefully considered so that it aligns with specific learning outcome criteria. Furthermore, if the aim is to have the entire cohort achieve the learning outcome criteria, focusing on these criteria together will enable peer interactions and teaching center on those criteria rather than students splitting into individual levels.

Limitations

Research Design and Procedure

The study design was mostly quantitative. A control group would enable a comparison between students doing the activity and those who watched a more passive explanation of slide formatting. In the absence of a control group, a couple of extremely easy learning outcomes could be added to test that students are responding accurately. For example, asking them to open PowerPoint and also to type text on a slide. It would be expected that nearly all students would already know that and therefore answer "same" for the degree of learning compared with previous knowledge.

Engagement with the learning activity could also be studied through greater focus on how the students experienced the activity and how it impacted their learning. This may be achieved through a narrative inquiry of the students' experiences of the activity.

Lack of Laptops

In some contexts, students may not have laptops. If there are not enough students with laptops for at least one between three, the task could be assigned for a computer lab or as homework when students may have access to a computer. In this study students were sometimes in groups of three and although they seemed

engaged, it limited the amount of practice individual students could have in using software on a laptop. Some students insisted on working alone, but they still benefitted from seeing peers' work during the gallery section of the activity.

Students Not Watching the Flipped Classroom Video

It is possible that some students had not watched the explanatory video prior to attending the class. A summary of research has reported the value of the flipped classroom format, but also cautions some students may not have good online access or feel that preparation time outside of the classroom is too much (Betihavas et al., 2016). In the current study, students were not asked if they had previewed the video prior to attending class. Further research could determine what value the video had as part of the activity.

Knowledge Transfer

Student evaluation of the activity was based on anonymous questionnaires immediately after the activity. Further ethical approval would be required for permission to include actual student examples of slides or to follow their progress to the slides they submitted for the summative assessment. The aim at this stage was to obtain honest student opinions without fear of association with their actual assessment. Now that student engagement with the activity is established, future research could follow through to determine how knowledge and skills gained in the activity transfers to the slides submitted for the summative assessment.

Implications and Recommendations

The slide formatting learning outcomes in this study appeared to be engaging and useful learning for most students in the cohort. Therefore, these are recommended for other contexts that include students with few or basic skills in slide design. Considering the mismatch between student belief in their ability to resize and the lack of achievement of this learning outcome, more instruction is needed about resizing objects. Overall, flexibility in the content or timing of this exercise can be adjusted for different contexts with more advanced learners. Teachers can change the content and images to suit the topics of their students. For example, information may vary in terms of text, graphs, figures, equations, or images required for the students' discipline. The level of skill required can also be adjusted to suit the competence level of the student cohort. Educators can share their knowledge of their students in collaborating with learning advisors to develop effective activities for their students' learning (National Institute for Learning Outcomes Assessment, 2016). As with the activity reported here, ten important principles of slide design that were most appropriate to display discipline-relevant content can be selected and also used to align with learning outcomes.

In the open questions, students mentioned wanting the option to work on actual assessment slides. In classes with more generous time allowances, students could return to their slides to make modifications based on what they observed from others during the gallery section. If more time is available, greater authenticity

could be achieved by having students select content they will be using for an assessment and select a picture from the internet or their own images. Students could also work on reformatting a complete set of slides for an entire presentation. In classes with large numbers and limited time, peers could check each other's work for achievement of the formatting requirements.

Conclusion

Oral presentation skills often include the design of effective visuals such as slides. Academic and professional competency require these skills; however, training in these skills in higher education can be limited due to time, clarity of expectations, and student unfamiliarity with design software. The slide activity reported here created a time-efficient, experiential activity that students found engaging, and felt they had learned skills that were clearly aligned to the learning outcomes of their future assessment. The results of this study show that the creation of digital artefacts, such as slides, benefits from experiential learning rather than traditional didactic lecturing. Furthermore peer-teaching assisted the engagement with the concepts and design software. The ease in which this task can be modified to suit other contexts makes it a valuable activity to consider when engaging students in experiential learning activities on basic slides design principles within a limited amount of time.

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Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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