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Assessing digital multimodal composing in second language writing: Towards a process-based model

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ABSTRACT

Research into digital multimodal composing highlights its potential effectiveness as an engaging, motivating, autonomy-enhancing, voice-enhancing and authentic activity for L2 writers. While considerable work has gone into developing and evaluating pedagogies for digital multimodal composing, one underresearched area is that of assessment. Given that the primary goal of digital multimodal composing is to develop competencies in multiple modes (including language) the question here is how to reflect this goal in the design of appropriate assessment criteria. In particular, teachers and researchers need to establish what dimensions of multimodal communicative competence to assess and how. In this paper, we present a case study of a university English for science course in which one of the assignments is a digital video scientific documentary. The study draws on interviews with teachers in order to determine how they conceive of the multimodal assessment task, including practical issues as well as challenges faced. The article proposes a process-based model for the assessment of digital multimodal composing, which shows how processes of instruction, design activity and assessment interact. Assessment can be planned at different stages of the design activity, draw on formative and summative strategies, and must take into account the orchestration of multimodal affordances.

1. Introduction

The question of what it means to write in the digital age, and so, what it means to teach and learn writing, is one that has recently received attention in the field of second language (L2) writing (Belcher, 2017; Casanave, 2017). There is, as yet, no agreed upon answer to this question but it has been argued that the affordances of digital media - hypertext, multimodality, and interactivity - have had a profound effect on the range of available resources for making meaning. Even with relatively stable practices like scholarly writing, we are seeing the proliferation of new and innovative text forms: video methods articles in the life sciences (Hafner, 2018), visual abstracts in academic articles (Sancho Guinda, 2015), crowd-funding proposals for academic projects (Mehlenbacher, 2017), academic blogs engaging a wide audience (Luzón, 2013). Such innovative text types both incorporate new forms of multimodal representation and are designed for wider, 'diversified' audiences on the internet, that often have the potential to interact. As a result of these kinds of innovations, there have for some time been calls for language and literacy educators to rethink their curricula, expanding them to take into account new forms of representation and communication in digital media (Hafner et al., 2015; Kress, 2000; New London Group, 1996).

In L2 writing, one approach that has emerged to address new forms of representation in digital media is multimodal composing, which goes beyond traditional written forms to include other modes of expression. Multimodal composing need not necessarily rely

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on digital media (see Shipka, 2011), though digital media does offer some unique affordances, especially the ability to engage with a wide, public audience through the internet. Those that are especially interested in this full range of digital affordances refer to the approach as digital multimodal composing (DMC), which is the term that we adopt in this paper (see Hafner & Miller, 2019; Jiang, 2017). DMC projects could include many different kinds of composing: web pages, blogs, wikis, podcasts, different kinds of videos, video games, infographics, posters, brochures (for some examples from L2 writing contexts, see Castañeda, 2012; Cimasko & Shin, 2017; Hafner & Miller, 2011, 2019; Shin & Cimasko, 2008; Yang, 2012). In addition to meeting students' real-world needs in a digitally mediated world, research also shows how the approach may foster learner autonomy, enhance student voice, and heighten genre awareness, among other benefits (see Belcher, 2017; Yi, Shin Cimasko et al., 2019 for a summary of the research).

While considerable work has gone into elaborating instructional designs for DMC, much less has been said on the issue of assessment, including whether and how it will be possible for instructors to feed back to L2 writers on their multimodal compositions. Yi, King, and Safriani (2017) therefore call for more research on assessment practices for DMC in the L2 writing context. One especially interesting question, as framed by McKee and DeVoss (2013, p. n.p.) is 'How do different approaches to assessing traditional writing (8 1/2″ x 11″ word-centric texts) port—or not—to the assessment of digital writing?' This article addresses this issue by examining teachers' perceptions of assessment processes for a student-generated digital video project on a course in English for science at a university in Hong Kong. We are especially interested to examine what criteria teachers apply as they grade videos and the practical issues and challenges that they perceive.

1.1. Assessing digital multimodal composing

As part of the ongoing project of embedding digital literacies in the language curriculum, it is important to pay attention to assessment for a number of reasons. First, while national curriculum documents in many places now exhort language and literacy educators to develop the digital literacies of students, high-stakes state examinations have nevertheless tended to neglect developments in digital media. This leads to negative washback, with teachers often undervaluing digital literacies, seeing them as an optional 'add-on' (Mills and Exley, 2014). Second, teachers may lack confidence in their own ability to assess multimodal compositions (Murray, Sheets, & Williams, 2010), which draw on a much larger range of semiotic resources than traditional print-based writing.

Such a lack of confidence is certainly understandable: the challenges associated with multimodal texts are illustrated in research on multimodality, which highlights the way that multiple modes combine in order to make meaning. While constraints of space prevent a full review of the relevant work, we note that scholars of multimodality (see Kress, 2010; Kress & Jewitt, 2003) have developed a number of concepts to cope with this multiplicity. Instead of 'writing', they now talk about 'design'. Texts are referred to as 'multimodal ensembles' that are 'orchestrated' intentionally to achieve the desired effects of their authors. Furthermore, different modes have different affordances and can therefore carry different kinds of meanings in different ways. When modes are combined, some modes are better suited to some kinds of meanings - they are 'functionally specialised'. In order to effectively assess DMC, it is necessary for teachers to develop an awareness of concepts like these and apply them in their practices.

Research is being conducted in both L1 and L2 contexts. In L2 contexts, a number of scholars have begun to address the issue of assessment of DMC (e.g., Hung, Chiu and Yeh, 2013; Towndrow et al., 2013; Yi et al., 2017). At the same time, the issue has also received attention from L1 literacy scholars (e.g., Burke & Hammet, 2009; Hicks, 2015; Neal, 2011). Here, we draw on both sets of literature in order to develop an understanding of the main issues and options. Practically, the literature suggests that two important considerations for teachers assessing DMC are: 1) when to assess; 2) what to assess.

1.2. When to assess: Stages of a DMC project

Towndrow et al. (2013, p.364), writing in the Singapore secondary school context, express reservations about engaging teachers in the assessment of DMC products, noting that 'Teachers cannot be expected to engender or assess these critical new-media literacy capacities if they do not know what they comprise and how to recognize and interpret their realizations in instances of practice'. With this in mind, an initial choice in an assessment strategy is therefore whether to assess the product or not. Assessment can of course be planned: 1) before/during the creation of the product; and 2) after the creation of the product. Furthermore, assessment can involve self-, peer-, and teacher-led assessment. Colby (2014) provides an interesting example of a DMC project, the creation of a persuasive video game, where the assessment design deliberately avoided assessing the games that students designed as products. Instead, students combined a number of documents into a reflective portfolio, and these documents included: written descriptions of the designer's rhetorical intentions; written reports of collaborative work; a prospective studio plan articulating planned processes; and peer evaluations at different stages of the design process, focusing on questions like 'Does the composition have a thesis or controlling idea?' Similar to this approach, Shipka (2011) uses a 'Statement of Goals and Choices' with her L1 composition students in which students explain the multimodal rhetorical choices that they have made. Such strategies provide an alternative method of assessing what Towndrow et al. (2013) refer to as students' 'semiotic awareness'.

1.3. What to assess: Semiotic resources deployed

The literature also describes attempts to develop rubrics for the assessment of DMC products. Given the complexity of multimodal compositions, an issue that must be addressed here is what kind of criteria can be productively applied. Added to this is the issue that the affordances of digital media change frequently over time: criteria that initially appear relevant could rapidly be superseded by

technological developments. Rubrics that have been developed include those that are 1) theory driven, 2) practice-based, and 3) adaptable. First, Hung et al. (2013), writing in the Taiwanese university context, describe a theory-driven rubric based on categories derived from a pedagogy of multiliteracies (New London Group, 1996). The rubric assesses multimodal design with respect to linguistic, visual, gestural, auditory and spatial design, asking especially whether the use of such resources enables or limits the author's communication of meaning. Second, the Multimodal Assessment Project group (Eidman-Aadahl et al., 2013), writing in the U.S. context, proposes a practice-based rubric, which is derived from teachers' experiences and practices with respect to DMC. The rubric includes the following dimensions: artifact, rhetorical skills, substance, process management and technical skills, and habits of mind. Finally, Burnett, Frazee, Hungge and Madden (2014) show how such practice-based rubrics can also be designed to be flexible, with criteria that can be adapted to a range of different multimodal design tasks. Their rubric, designed for L1 composition classes, includes a focus on rhetorical awareness, stance and support, organization, convention, and design for medium. It is important to note that such rubrics are intended not only for summative assessment of DMC products but also for formative self- and peer-assessment purposes at various points in the design process.

1.4. Locating criteria for the assessment of DMC

Moran and Herrington (2013) believe that the best source for guidance in assessing digital texts comes from teachers' actual practice. Certainly, engaging with teachers' perceptions and practices has the potential to highlight some of the possibilities and challenges that assessing multimodal composing brings with it, as teachers will always be an important part of this process. This article aims to describe teachers' perceptions of practices of assessment of multimodal composing on an English for science course in Hong Kong. This study addresses two main research questions:

1 What criteria do teachers apply in assessing multimodal compositions?
2 What practical issues and challenges do they perceive in this process?

2. Methodology

2.1. The English for science course

This study focuses on a well-established course in English for science at a university in Hong Kong, extensively described elsewhere (e.g. Hafner, 2014; Hafner & Miller, 2011, 2019). The course caters to a range of students enrolled in various Bachelor of Science programmes, including Applied Biology, Applied Chemistry, Applied Physics, Computing Mathematics, Environmental Science and Management, Surveying, Architecture, Biomedical Sciences, Veterinary Medicine. With this varied intake, it can be seen as adopting a wide-angled approach to English for academic purposes (EAP), while at the same time still aiming to develop in students the necessary communicative competence to engage in the disciplinary discourses of science, broadly conceived. At the time of writing, about 350 students per year take the course, the vast majority of whom are L2 writers with Cantonese as their L1. The course is compulsory for science major students as a part of the university's English language requirement. It is credit bearing and high stakes, as failure to complete the English language requirement would prevent a student from graduating from the university.

The 13-week course takes a project-based learning approach, with the syllabus structured around an 'English for science project'. This project involves students in the completion of a simulated scientific study, with student teams engaged in a simple field study on a topic provided by the course co-ordinator (for example, measuring noise pollution in different environments and comparing such measurements with people's perceptions of noise levels). The study is reported first as a digital video scientific documentary uploaded to YouTube and made accessible to the public (a teamwork task, submitted in week 7); second, as a written scientific report designed for a specialist audience (an individual task, submitted at the end of the course). We focus here on the first task, the digital video scientific documentary, as a form of digital multimodal composing. On this DMC project, students go through a number of stages: 1) reading/data collection; 2) scripting/storyboarding; 3) performing/recording; 4) editing; and 5) sharing. Each of these stages is supported by relevant in-class materials and activities. For example, in the reading and data collection phase, students learn the necessary critical literacies to reliably find and evaluate information; in the scripting/storyboarding phase, students learn the genre of scientific documentary, including multimodal elements.

2.2. Assessing the DMC project

The aim of the DMC project, which results in the creation of a digital video scientific documentary, is to develop students' multimodal communicative competence with respect to a non-specialist audience on a science-related topic. According to the assignment prompt, students are expected to document the process and findings of their study, including: 1) description of topic; 2) introduction and background theory; 3) procedure, with 'photographs or other multimedia presentation of the materials and set-up'; 4) results, with 'tables and charts'; 5) discussion; 6) conclusion; and 7) credits for remixed material (e.g. soundtrack). Another requirement is that 'Your documentary must include a range of media (e.g. video, audio, images, text, diagrams and so on), and **all members** of the project team must be involved in the narration of the documentary' (Assignment prompt, emphasis in original). In addition, the prompt encourages students to: 1) present information creatively by using interesting locations and presentation techniques; and 2) visit the university writing studio and speaking studio for help with script writing and presentation skills.

The DMC project is assessed in two main ways. First, a video sharing session is held in week 7 of the course, during which students

play their videos to the rest of the class and answer questions about them. The videos themselves are assessed by teachers at this stage, who follow a rubric developed for the task. This counts for 30% of the coursework grade. Second, students submit a reflective report describing the DMC project process in week 8. They are asked to reflect on: the English language learning opportunities that they had in the project process; and how their understanding of scientific communication, in its written, spoken and visual aspects, has changed as a result of the project (10% of the coursework grade). In this way, the assessment focuses on both the DMC process and its product.

The rubric used in assessing the scientific documentaries was adapted from one used to assess oral presentations on an ESP course. This practice-based approach has the advantage of being easily amenable to ESP teachers in the institution, as the kinds of categories that the rubric draws on will be similar to those that they are used to assessing for oral presentations (which are, of course, also highly multimodal). A possible disadvantage, which we are attempting to address with this study, is that the criteria adopted may skip over important multimodal elements related to the scientific documentary genre. The rubric is divided into three categories, of equal weighting: 1) Organization and content; 2) Multimedia and visual effects; and 3) Language. There are 5 bands for each category, indicating different levels of mastery: outstanding, good, satisfactory, marginal and failed. Fig. 1 shows the band descriptors.

There is some emphasis on creativity and originality in the assessment of organization and content, with the descriptors calling for 'creative/original' presentation of information, an 'attention-grabbing opening', and a 'memorable conclusion/ending'. This is balanced by a requirement to also 'follow scientific conventions'. The assessment of multimedia and visual effects focuses on 'creative and interesting visuals' as well as 'appropriate variety'. Language is assessed according to fluency, accuracy and appropriacy.

As with any rubric, it is not immediately clear what these descriptors mean in practice. For example, what exactly is to be considered 'outstanding' fluency and accuracy? Teachers learn to apply the rubric by attending a standardization session, in which they grade sample videos and are provided with feedback on grades awarded, summarized in a 'standardization package'. This standardization procedure allows the course co-ordinator not only to address issues of standards to be applied but also to clarify how some important aspects of multimodal composing should be handled: for example, pace of the video and use of soundtrack are to be considered when assigning a grade for multimedia and visual effects while issues of delivery fall into the language category.

2.3. Participants

This study aims to determine both what criteria teachers apply in assessing DMC projects and how they perceive that process. In order to achieve those aims, we approached all of the teachers who had taught the English for science course over the last two years and requested an interview. All of the teachers approached, a total of seven, agreed to be interviewed. Five of the participants are men, two are women. There is a wide range in terms of age, with participants in the 20–30 year bracket (1), 31–40 years (4), and 60 or above (2). There is also a wide range of teaching experience: from two years to over thirty years (on average, approximately 11 years). One participant holds a PhD, four hold Master's degrees and two hold Bachelor's degrees. As to experience on this particular English for science course, there is a mixture of veterans and newcomers: one teacher reported teaching the course 18 times, while another had taught the course just once at the time of the interview. Asked to rate their confidence in using technology for educational purposes in their teaching (on a scale of 1–10, where 10 is extremely confident) the average response was over eight. Overall, the participants in the interview make up a diverse and well-qualified group of university teachers. It should be noted that the first author is the co-ordinator of the course and interview findings need to be interpreted with this in mind. All teachers gave informed consent, indicating that they understood that participation had no bearing on their teaching evaluations and that they could withdraw from the study at any time.

2.4. Interview procedure

Before the interview, we contacted participants and asked them to select two videos created by their own students to comment on in the interview: one highly rated, one less highly rated. Interviews were 45–60 minutes long and conducted by the authors. The semi-structured interview procedure began with a general question about what teachers are looking for when they evaluate a digital video documentary. The aim of asking such a general question was to elicit a range of responses, as much as possible not guided by the question type. A copy of the rubric was available to teachers. Teachers had used the rubric on the course before the interview and their perceptions of the rubric might be reflected in the interview. Next, we viewed the videos selected by the teachers, following a procedure similar to a text-based interview and asking teachers to comment on any features that they evaluated positively or negatively. Here, the aim was to identify concrete instances of multimodal features that teachers found significant. This phase was followed up by prompting teachers to comment on each video with respect to relevant criteria from the rubric, i.e. visual effects, accompanying soundtrack, language used, organization and content, and use of multimedia as a whole. In the final phase of the interview, we asked a number of general questions about the video grading process, e.g. 'How do you feel about grading videos?' or 'How is grading videos different/similar to other coursework that you have graded in other courses?' The full list of questions used in the interview process is included in Appendix A.

2.5. Analytical methods

The interviews were transcribed and imported into MaxQDA (Verbi Software, 2018), a computer-based qualitative data analysis tool. Interviews were then analyzed by the authors using a thematic analysis procedure (Braun & Clarke, 2006). First, we immersed ourselves in the data by re-viewing the interviews/reading the transcripts and taking notes on any observations made. Then, we met

Detailed criteria for Assignment 1: Scientific documentary

	Organization and content	Multimedia and visual effects	Language
Outstanding	Able to present information in a clearly organized and creative/original way, using effective signposting with an attention-grabbing opening, an effectively organized body which clearly follows scientific conventions, and a memorable conclusion/ending.	Able to design creative and interesting visuals which effectively and appropriately support the documentary and utilize an appropriate variety of multimedia and visual effects, e.g. video clips, pictures, objects, graphs, diagrams, tables.	Able to express ideas in fluent, accurate English with few errors (of grammar, vocabulary, pronunciation), using appropriate language for the context.
Good	Able to present information in an organized and somewhat creative/original way, using appropriate signposting, with a clear opening, a clear body which follows scientific conventions, and a clear conclusion/ending.	Able to design visuals which appropriately support the documentary and utilize an appropriate variety of multimedia and visual effects.	Able to express ideas in fluent, accurate English with some errors, using mostly appropriate language for the context.
Satisfactory	Able to present information in a moderately organized and moderately creative/original way, using some signposting, with a brief opening, a moderately organized body which mostly follows scientific conventions, and a short conclusion.	Able to design visuals which are moderately appropriate, support the documentary moderately well, and utilize a somewhat limited and/or somewhat inappropriate range of multimedia and visual effects.	Able to express ideas in mostly fluent, accurate English with some errors, using mostly appropriate language for the context.
Marginal	Little evidence that the student is able to present information in an adequately organized and creative/original way, with a brief opening, a moderately organized body which may not follow scientific conventions and a short conclusion.	Little evidence that the student is able to design visuals which are mostly appropriate, support the documentary most of the time and utilize a range of visual aids. The visuals may be very wordy and/or inappropriate.	Little evidence that the student is able to express ideas in mostly fluent, accurate English with some errors, using mostly appropriate language for the context.
Failed	Unable to present information in an adequately organized and creative/original way, with a brief opening, a body which may follow scientific conventions, and short conclusion. The body of the presentation is poorly organized.	Unable to design appropriate visuals which support the presentation and utilize a range of visual aids. The visuals are very wordy and/or inappropriate.	The documentary is difficult to understand because of language issues.

Fig. 1. Band descriptors for the scientific documentary assignment.

to compare notes and discuss potential codes. A tentative coding scheme emerged from this meeting in an inductive fashion. Next, we individually coded a single interview (the same one) and met again to compare coding and refine the coding scheme. Finally, the remaining interviews were coded by the second author, making adjustments to the coding scheme where necessary and confirming any adjustments with a final read-through of the data. A process of constant comparison (Richards, 2003) was used in order to ensure the trustworthiness of the analysis. At this stage themes emerging from the data were identified and reviewed. The major themes that were identified were: creativity and originality, organization, language, delivery, modal interaction, variety, genre.

3. Findings

3.1. What teachers are looking for

Teachers were shown the highly-rated and less highly-rated samples of the videos that they had chosen before attending the interview, and were asked to comment on which features of the videos they evaluated either positively or negatively. In this section we outline the major themes that emerged from the data.

3.1.1. Creativity and originality

When assessing the documentaries, four teachers looked for evidence of creativity and originality. They see these as a way to demonstrate that students are able to appropriate the language and other modes so that they suit the genre and the intended audience, i.e., people with no specialized knowledge in science. For example, with respect to language, Calvin said:

> *It's good to see the students' effort and the students' creativity. And how they're able to use English language in a completely new format to the students.* [Interview, Calvin]

In addition, creativity and originality are also related to the multimodal aspects of organization, content, and the delivery, including the choice of material setting, which could be selected to make the documentaries entertaining:

> *So that section, I felt that they were very creative with the setting or the background of how they wanted to kind of in many ways entertain the audience so I thought that was quite entertaining. The narrator of that section actually sort of came in with various costumes. Yea, I thought that was really entertaining and was really really well produced.* [Interview, Alex]

In the video that Alex commented on, which is about multitasking, the students shot the video in different parts of the campus, and every time that the narrator appeared on the screen, he had a different costume. For instance, a student was shown pretending to multitask in the library, searching on a computer and playing basketball while dressed in a formal suit. In another shot, a student wearing sportswear was seen trying to read a script, dribbling a basketball and texting at the same time outside the halls of residence.

3.1.2. Organization

All teachers commented on the organization of the documentary. As indicated in the rubric, they all looked for evidence to show that students were able to apply the Introduction-Methods-Results-Discussion (IMRD) structure, or some variation of it, in the documentary in a coherent way:

> *It [the highly-rated documentary] is quite coherent […] you can see the major component that you will expect in a scientific documentary like introduction, method, result, discussion, conclusion. And in each section, they have a very coherent development for the ideas.* [Interview, Justin]

Of particular importance seems to be an attention-grabbing opening, which is emphasized in the course materials and assessment rubric. Four teachers commented that this is what they looked for:

> *The first thing I noticed actually with this video [the highly-rated video] is the organization, the structure. It was written very clearly in a sense that they had a very interesting opening. They had a very clear question that was obviously presented by their prompt that was provided to them. They went through the procedures and then they answered the question and then they came to a general conclusion.* [Interview, Alex]

> *I think the organization is really good because the opening, it was attention-grabbing and then it is very clear in terms of the meaning, the audience into the topic about the noise. I think they have some little dramas, some b-rolls, so I think the introduction, the opening is very clear.* [Interview, Joyce]

The way interviews were structured is also something teachers paid attention to, as can be seen in this teacher's comments on a less highly-rated video:

> *So again, he is reading the questions from his telephone. And again, they are kind of leading questions, he's giving answers* and *they just have to choose one of the predetermined options. Another thing, I think they are the same questions that the previous boy asked. And if we compared it to the first video [the highly-rated video], they have one person asked the question just once and then boom boom boom all the answers. And this one is going, long boring questions followed by yes. Another long boring question followed by no. Another long boring question followed by option B. And then they repeat that pattern again and again and repeating the questions again.* [Interview, Chris]

Comparing how students asked interview questions in a good example and a poor example, instead of reading out the same

questions to different participants, Chris expressed that one person asking the question and showing the responses from different participants is the most efficient and effective strategy.

3.1.3. Language

As this is an assessment for a university English course, all teachers showed a high awareness of the language used in the videos. As with other kinds of assignments, the accuracy of pronunciation and grammar is something that teachers paid attention to. All teachers expressed that having clear pronunciation is important, and five teachers reported paying attention to grammatical accuracy.

I think in terms of the language, they can work more as we can see that the fluency is not that good. The pronunciation, some mispronounced words and some errors, grammatical errors, as you can see. [Interview, Joyce]
For the language, generally, you can find poor pronunciation, wrong grammar […] [Interview, Justin]

I do tend to focus on pronunciation, pronunciation in a very broad sense, so like I mentioned before, clustering, pausing, intonation, stress, etc. And sometimes I think I focus on those aspects of pronunciation more than I do on say grammar, or vocabulary or stuff like this. That's probably just a particular thing of mine, an idiosyncrasy of me. [Interview, Chris]

While most teachers see having good pronunciation as an important element of creating a good scientific documentary, two teachers are more relaxed about it and focused on the overall meaning. When Alex was asked whether the mispronunciations in a video led him to evaluate it more negatively, he responded:

Slightly, slightly. But I think there's a lot more positive aspects that of course I acknowledge that there's a mishap for mispronunciation but there are so many other good things that, present the video that, you would sort of really heard them […] [Interview, Alex]

Similarly, Joyce expressed her high tolerance to language issues:

And then language, although I think language there are some mispronunciation, maybe fluency issue, but comparatively speaking, I think they are pretty good in terms of the language. So that's the good one. [Interview, Joyce]

It can then be seen that teachers place a different degree of emphasis on language when assessing the videos.

3.1.4. Delivery

All of the teachers paid attention to the multimodal, embodied performance of students as they used language, their bodies and material artefacts to convey meaning. Along with two of the teachers, we call this dimension 'delivery'. It includes a range of things, such as accuracy of language, fluency, pronunciation, stress, intonation, pace, gesture, and so on. It also includes the manner and attitude displayed by students if they chose to do on-screen narration:

It [the narration] seemed rehearsed, relaxed, not reading off the script. But they had, they had obviously written the script and rehearsed it but not obviously memorized or they didn't read from it. And so I think that improved their language and pronunciation and particular intonation stresses there are. And their gestures when presenting were nicer. It's a lot more interesting to watch. [Interview, Chris]

Some teachers also expressed their preference for students to do on-screen narration, where they directly address the camera as a visual participant on screen who is visible to the documentary audience, as opposed to a voice-over, where students record a narration but are not portrayed on screen. One teacher commented that on-screen narration provides students with an opportunity to demonstrate their delivery skills:

It's much easier to just read the text, versus to perform a text to an audience. I think the camera is the same as an audience, as we actually covered in the lessons, the difference in a presentation and presenting to a camera in a documentary. There's not that much difference because you still have to get it right for the camera, you may have a few practice shots and okay that's not very good, start again. You've got it right for the camera in the sense of get it right for the audience. [Interview, Ken]

When asked why Justin would evaluate the presence of an on-screen narrator positively, he responded:

Because you can see the person talking to you as audience, so there's sort of like building the interaction virtually. [Interview, Justin]

The above teachers seem to show a preference for on-screen narration. The idea of doing on-screen narration as superior to doing a voice-over is an interesting one. It seems that the percieved spontaneity of doing on-screen narration actually helps students to have better delivery in the eyes of their teachers. Teachers also believed that doing on-screen narration requires more rehearsal and practice than doing a voice-over, and teachers value this 'extra effort' to interact with the audience and evaluated it positively.

3.1.5. Modal interaction

One thing that teachers paid attention to is the way that students combined different modes in interaction. As noted in Jones and Hafner (2012) modes can interact in a range of ways: concurrence, when different modes present the same meanings; complementarity, when modes support one another but also 'fill in gaps' in meaning; divergence, when meanings presented in different modes are different. From the interview, it was found that teachers looked for concurrence and complementarity between narration, on-screen texts, images and sound. They evaluate the documentary positively if they can see that meanings presented in different modes support each other, as noted by Calvin:

I like the background music. It creates sort of an upbeat mood right there. Like I said, I like the video editing. They have included different footages. And the different footages that they actually blending very well together and is actually adding value to the script that they have prepared. [Interview, Calvin]

The video that Calvin commented on was a documentary about light pollution. The video started with an interview of a few tourists with the question 'what do you think about the lighting in Hong Kong?' Students then presented research about the effect of excessive light on human health. They then filmed themselves measuring the level of light in several locations in Hong Kong while describing the methods and instruments used. The images shown on the screen added to the narration of the methods section. The sound level of the soundtrack throughout the whole video was carefully managed so that the key message in the aural narration would not be drowned out by the soundtrack. The music was upbeat so it fit with the overall message of the video that light pollution can be solved by the concerted effort of different stakeholders.

Some teachers saw concurrence and complementarity as a reflection of students' ability to synthesize complex information and to make scientific research accessible to the intended audience, i.e. the general public:

I like how the text is appearing on the screen. So then they highlight and they pick out the key points from this research from this university […] So then it's easier for the audience to get the main point. Usually when they [students] go through the literature review, they just read it out and the audience might not be so warmed up to the topic. So it's nice to have the text that is on the screen. [Interview, Elaine]

Elaine commented on a video about the cognitive effect of music. In the introduction of the documentary, instead of just reading out the findings of the different research articles, the students summarized the main points of the articles and presented them as keywords. The keywords were overlaid on top of footage which showed a student working on an assignment while listening to music. This is another example of concurrence and complementarity where the different modes reinforce and add to each other. Written text, speech, and visual footage reinforce and add meaning to each other. This is an example of modal interaction.

However, sometimes divergence occurs when the visual and textual information offer meanings that are different from each other. The interviews suggest that, while such divergence occurred rarely, it is normally evaluated negatively. Calvin shared with us an example of divergence which resulted in what he called 'a disaster':

It went well until they started presenting the results. That became a disaster because they have arranged one of the members standing in front of the white board[…] and that person was not really explaining himself. Rather, they have the narrator to explain it for him. I think it's a disaster[…] It's distracting. If it were the person standing in front of the camera who's doing the speaking, it won't be that bad. [Interview, Calvin]

Nevertheless, when divergence is used appropriately, for example, to create humour, this is also something that teachers evaluated positively. For example, Elaine shared an example in which the screen shows an image of the boxer Mohammad Ali, which happens to be the name of one member of the student group. The narration goes: 'This is Mohammad Ali (the boxer), but this is the one we have'. The image on screen showed the muscle-bound boxer Mohammad Ali, then changed to the much less muscular student sniffing a sunflower in a delicate way. Although this short episode did not add to the experiential meaning of the documentary, and was not related to the propositional content, it added an interpersonal element of humour to the documentary, and Elaine expressed that she appreciated that.

3.1.6. Variety

Teachers were also looking for varied use of semiotic resources. Variety, which could be seen as a particular form of creativity, is manifested in the way multimodal resources are deployed. The emphasis is on the use of a 'range' of resources with 'different' forms of expression in multiple modes and how these resources are used differently from the 'standard'. Variety is used by students to maintain interest, and a low level of innovation can be seen. Variety can be achieved on different levels. On the level of organization and content, even though students were encouraged to adopt a version of the IMRD structure (including an attention-grabbing opening and a memorable conclusion), different groups may realize this in a different way to create variety:

It [the highly-rated video] follows the standard organization that we taught them in the course, but they were able to take it one step further. And because very often, when we asked them to integrate some interviews, you know, go out and interview people, they would have a particular section reserved for the interview. [Interview, Calvin]

In the quote above, Calvin commented on the structure of the video. Instead of showing all interview results in one dedicated section like most students, this group integrated short segments of the interview throughout the entire documentary to add variety to the IMRD structure. Calvin further commented that not only was it a show of creativity, it also added to the overall cohesion of the video.

Some teachers also looked for variety in the use of multimodal resources. For instance, the use of different soundtracks for different sections in the documentary is evaluated positively:

The soundtrack became, I am sure they got it from the Creative Commons and they have used a different one for each section, so if you use the same soundtrack throughout the eight minutes, it's gonnanot mean anything to the audience anymore. They kind of got used to the soundtracks. So it's nice to switch it up and it's not too dramatic where it startles the audience. [Interview, Elaine]

When they first describe multitasking like the student trying to go to different places [at the university] and then trying to capture different moment when student need to encounter multitasking this issue. So, I think the beginning is quite attractive like trying to draw the

audience's attention about this topic. [Interview, Justin]

For instance, in the introduction of the video that Justin commented on, which is about multitasking, the documentary showed footage of different locations, such as busy streets, shopping malls, university classrooms, and so on. The narration was about the busy lifestyle of Hong Kong people, and the different locations and the fast pace of the footage reinforce the idea that multitasking is what people do all the time.

The varied shots of different locations and settings is also regarded positively by other teachers:

So I thought those three pictures were quite nice as they were talking about the different areas Mong Kok, is it Tsim Sha Tsui I can't remember,and then the urban area and then the three different shots of those three different places. I thought that was quite nice. [Interview, Chris]

The variety of interview participants is also seen as positive:

They have good interviewees like students in a lab, men and women, lecturer and professor, Chinese and also expats. So I think they got a range of interviewees. Very nice. [Interview, Justin]

The use of the popular website *Powtoon (*https://www.powtoon.com) to create animation is also seen as something that adds to variety by some teachers.

3.1.7. Genre

All of the teachers paid attention to considerations related to genre. As noted above, this includes elements of organizational structure and language, which must be appropriate for the genre. Teachers also paid attention to issues of audience and purpose.

Because this is a scientific documentary, it's most likely spoken, and also it's like publishing in the YouTube, so I'll expect them to use like everyday language when they describe some scientific ideas, rather than like very specific like using a lot of jargon to illustrate certain scientific concept. [Interview, Justin]

They communicated the story well in terms of telling the audience what they were doing in the right genre of, as a documentary, not being too technical and not being too descriptive, just describing the process of what they're talking about. [Interview, Ken]

Normally, wouldn't be asking them to, you know, include the limitations of the study in a documentary, just like that. Probably they have looked at how other people have written the final report and throw it in there as well. I don't think it's appropriate right there but I haven't really marked them down. [Interview, Calvin]

As the intended audience is the general public, the main purpose of the documentary is to communicate scientific concepts in an accessible way. This is achieved through the use of everyday language, choice of vocabulary, the use of visuals to communicate abstract scientific concepts, and to select suitable content.

3.2. What practical issues and challenges teachers identify

The second part of the interview focused on the challenges that teachers faced when grading videos, the comparison between grading videos and other types of assignments, and how they think the existing rubric can be improved.

3.2.1. Challenges

The university teachers interviewed mostly have a background in language teaching. When asked about the challenges they faced when grading videos, a number of teachers expressed that it was related to the amount of information to consider:

I need to re-watch the video several times in order to make a more reliable judgement because I can't focus on different aspects at one time. [Interview, Joyce]

The problem with all of these is there are lots and lots of different areas that you can get marks to […] How important is the sound? How important is, you know, the nice bit of walking towards to the camera, which is a good touch but, you know, you gotta add all of those many many things to go to get one mark. [Interview, Ken]

There's more things to look at. You have to look at language, you have to look at the fluency, accuracy, whether there's many errors or just few errors or some errors. We have to make that judgement, right? [Interview, Alex]

As the videos are multimodal in nature, teachers have to consider multiple modes as they grade, and they need to pay attention to how they are combined to make meaning, thereby requiring them to consider more information simultaneously than grading other types of assignments that make use of a narrower range of modes.

3.2.2. Similarities and differences

There are some similarities and differences between grading videos and other kinds of assignments, such as essays and presentations. In terms of similarities, teachers commented:

We're looking at very similar elements here: organization and content, and how they're using language. [Interview, Calvin]

I keep mentioning stress, intonation, pronunciation, those kind of things that I react to in a similar way when grading presentations. [Interview, Chris]

On the other hand, grading videos seems to be different from grading other types of assignments in a number of ways. For instance, it requires multiple watching of the video in order for a teacher to decide on a grade, as compared to an essay:

I might have to watch the video more than once whereas perhaps for an essay, I can just sort of, let's say I am teaching argumentative essay or in this case the scientific report, oftentimes I already have a very clear structure. You know, the students also have very clear structure as well […] whereas with this production I might just need to look at it a couple of times just so that I can get a better judgement because there are so many things to look at, and things can easily be missed. [Interview, Alex]

All teachers identified the large amount of information in the videos as a challenge for grading. As videos are multimodal, teachers need to consider more modes simultaneously compared to when grading essays, where only the mode of language needs to be considered. In order to avoid missing something important, teachers commented that multiple watching of the videos is required.

Even though grading a video, to a certain extent, seems to be fairly similar to grading a presentation, one teacher pointed out that the affordances of video led to differences:

One thing with presentations, I tend to grade it on the spot, so hear them live, the students will get up and give their presentations. I just hear it live and decide the grade there, whereas these videos, I do it in the privacy in my office, with earphones on, not distracted. If I need to or if I want to, I can rewind or pause it. So quite different in that sense. [Interview, Chris]

3.2.3. Improvements on existing rubric

Teachers are generally satisfied with the existing rubric, as seen in the following quote:

I think it's good enough and I have seen rubrics that are not as clear as this. [Interview, Alex]

Some minor suggestions were made, such as including concrete examples to differentiate between an 'outstanding' and a 'good', adding 'pacing' as a criterion, breaking the rubric into smaller parts, or separating organization and content. Nevertheless, it has to be noted that rubrics for written work suffer from similar problems as those identified by teachers here: these issues are not exclusive to rubrics for grading videos. Going forward, teachers have identified two areas that could be addressed more clearly in the rubric: first, the notion of pace could be explicitly included in the multimedia and visual design category, and delivery could be explicitly included in the language category, in order to better match teachers' practices as promoted in standardisation sessions. On the basis of our analysis, one might consider whether adding categories to the rubric itself is necessary but it is perhaps debatable whether this would be productive. Burnett et al. (2014) suggest that well-designed rubrics focus on selected aspects and should be helpful for students to 'become capable self-critics and peer-reviewers' (p.54). With the understanding of rubric acting as a pedagogical tool to enhance students' capability to develop agency in learning, we suggest that additional dimensions such as 'delivery' and 'pace' can be integrated in the existing rubric.

4. Discussion and conclusions

To recap, this study addresses two main research questions: 1) what criteria do teachers apply in assessing multimodal compositions? and 2) what practical issues and challenges do they perceive in this process?

With respect to the first question, we found that teachers applied the following criteria in assessing multimodal compositions: 1) creativity and originality, 2) organization, 3) language, 4) delivery, 5) modal interaction, 6) variety, and 7) genre. Teachers look for creative and original work in terms of content, organization and language so that the documentary is educational and entertaining. They also pay attention to awareness of scientific conventions in organizing the documentary, such as the use of IMRD structure. Regarding language, they look for clear pronunciation and accurate grammar. Some prefer an on-screen narration to the use of voice-over. Teachers attend to the way students combine different modes in interaction, and evaluate positively when meanings presented in different modes support each other. Variety in organization and use of multimodal resources is also emphasized. Lastly, teachers focus on issues of audience and purpose so that meaning-making resources are chosen appropriately. These findings echo to an extent those of Wierszewski (2013) who noted that teachers assessing DMC use many of the same criteria as for print-based assessment but also go beyond such criteria to engage in more depth with the ideas of their students and with potential creativity.

In terms of assessment criteria, the themes of organization, language and genre identified by teachers resonate with categories proposed by Burnett et al. (2014), with their focus on rhetorical awareness, stance and support, organization, convention, and design for medium. At the same time the teachers' comments also went beyond those categories to explicitly engage with details of multimodal design. Other frameworks, like that of the MAP group (Eidman-Aadahl et al., 2013), demonstrate that one can also go beyond evaluation of the artefact itself to consider how students managed the process and developed relevant habits of mind.

In assessing the videos, teachers appear to be guided by one key principle of digital multimodal composing: multimodal orchestration. From the perspective of a social semiotic approach to multimodality, individual communicative resources are combined to form a multimodal ensemble, in which each resource takes on part of the meaning (Kress, 2010). When understanding the scientific documentaries created by students, teachers tend to look beyond the use of a particular resource in isolation and take into account the combined effect of the use of resources. As Kress (2010) reminds us, the term 'ensemble' emphasizes the modal multiplicity of the text, while the term 'orchestration' is related to the 'aptness' of the selection of resources from different modes. 'Aptness' refers to a

'best fit' of the relation of form and meaning, of whether the signifier is the 'best fit' to realize the signified. In Kress' words, it is about whether 'the form has the requisite features to be the carrier of the meaning' (p. 55). Together, ensemble and orchestration create 'semiotic harmony' (p.157). It appears that teachers perceive a good scientific documentary to be one in which all elements make meaning 'in harmony'. Similarly, where modal meanings diverge, as in Calvin's example which he referred to as a 'disaster', teachers may pick up on this 'dissonance' in their grading. We suggest that here, the creation of 'harmony' involves the selection of apt semiotic resources, appropriate for the genre, showing creativity and originality, and interacting with one another in a way that adds to the meaning of the whole ensemble.

With respect to our second question, teachers reported that one challenge they faced is the large amount of information that they needed to consider as they graded videos. They have to consider multiple modes simultaneously and this sometimes leads to them watching the video multiple times before arriving at a grade. Teachers also reflected on the similarities and differences between grading videos and other kinds of assignments, like essays and presentations. With respect to similarities, teachers mentioned that the focus on content, organization and language is similar to grading essays, and the emphasis on pronunciation and stress patterns is similar to grading presentations. On the other hand, grading videos is different to grading presentations as a decision need not be reached on the spot and the assessor can assign grades in the privacy of their office.

Another interesting finding is the degree of overlap between the features that teachers value in a scientific documentary, and the features that they value in other 'traditional' assignments such as oral presentations and essays. For instance, Chris mentioned that he looks for signs of good pronunciation, stress and intonation in both scientific documentaries and oral presentations; Calvin mentioned that in grading both documentaries and essays, he looks for good organization and content, as well as accurate language use. In general, the criteria that teachers pay attention to in traditional assessments and digital media are not entirely different. Rubrics originally designed for traditional assessments can potentially be portable to assessment for digital media.

At the same time, in developing a rubric for assessment of DMC, it will be necessary to account for the multimodal affordances of digital media. Hicks (2015) points out that any assessment criteria for DMC ought to be 'malleable' because of the way that digital media evolve as new communication tools and technologies are developed. This means adopting criteria that are sufficiently generic to be applicable to a range of different kinds of multimodal compositions. A genre-based model for assessment would appear to be a good place to start. For print-based texts, such a model traditionally focuses the assessor on issues of organization, grammar, and lexis, keeping in mind whether the resources deployed meet the expectations of the intended audience and achieve the desired communicative purpose (see Bhatia, 1993; Swales, 1990). For digital texts, this approach would need to be expanded so that the assessor also considers the way that the affordances of mode and media have been utilized. For example, the scientific documentaries that our students created use the semiotic affordances of video to make meaning and so we need to consider whether these affordances are deployed in ways that are expected, and, as Kress would put it, 'apt'.

Yi et al. (2017) remind us that it is important to develop assessment procedures for digital multimodal composing that cater to the specific needs of L2 writers to master language in combination with other modes, providing 'the necessary focus on language proficiency and assessment' (p. 881). Considering how emphasis might be given to linguistic issues, while at the same time engaging with the aim of developing a multimodal communicative competence that goes beyond language, we would suggest that a single assessment tool, like an assessment rubric for example, is unlikely to be sufficient. On our English for science course, language comes into focus as students work on the scripts and storyboards for their documentaries, an activity that is supported in class time through a writing workshop. It is at this point that both instructors and peers have the opportunity to provide formative feedback on drafts of scripts, assessing their effectiveness especially in terms of rhetorical organization and language use. This assessment is done informally in class but one could easily develop a more formal (though still formative) procedure. Regarding other specific needs of L2 writers, it is worth pointing out that these may go beyond the linguistic level to include intercultural communicative competence as it relates to multimodal resources (e.g., what a particular image means to a particular target L2 culture).

Indeed, if we see assessment as closely connected to learning, then it should become apparent that the design of assessment of DMC must involve various tools, formative and summative, and engage instructors, peers and self, at various points in the design process. In this sense, assessment can be timed so that students receive feedback as they create their scripts and storyboards, as they come up with a rough cut, as they share the final product with peers, and as they reflect on both the design process and the multimodal products that they have created. Feedback at various points in the process ought to draw attention to the semiotic choices that students have made and engage them in questioning those choices in a way that would enhance semiotic awareness (Towndrow et al., 2013). As Hung et al. (2013) note, a rubric that focuses on the use of different modes may serve as a useful tool to draw attention to the way that these modes contribute to making meaning. However, our study also suggests that assessment tools should address the way that meaning is orchestrated through the combination of modes in the multimodal ensemble.

Taking all of these factors into account, we can begin to see what a process-based model of assessment for DMC might look like, shown in Fig. 2.

The model depicts four main stages: pre-design, design, sharing, and reflecting. Assessment can be introduced at any of these stages, with formative assessment more likely earlier in the process and summative assessment later. Furthermore, assessment can take the form of self-, peer-, or teacher-led assessment, or some combination. Assessment will interact with design activities, which in turn make use of a range of documents: for example, the pre-design phase will likely generate plans, notes, and mindmaps, which could form the basis of assessment. During the design phase, students generate draft scripts, storyboards, film clips, and other media. In the sharing phase the focus is on the multimodal ensemble as a product and in the reflection phase conversations with students, presentations or reports by students will be generated. It would be desirable to focus on assessment, considering: 1) multimodal affordances, i.e., the way that different modes (linguistic, visual, gestural, auditory and spatial) contribute to meaning; and 2) multimodal orchestration, the way that modes are strategically combined to address a particular audience for a particular purpose

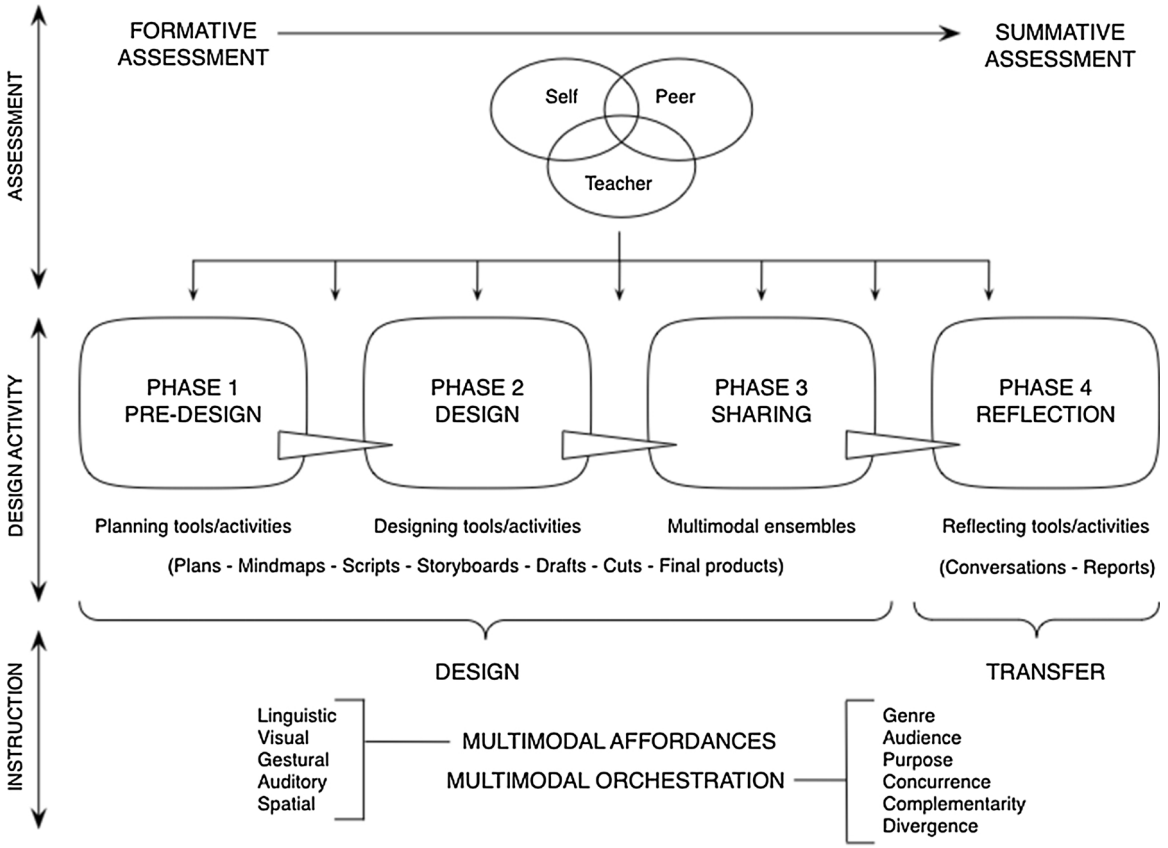

Fig. 2. A process-based model for assessing digital multimodal composing.

through concurrence, complementarity, and/or divergence of modal meanings (Unsworth, 2007). Finally, the model shows how the planning, design and sharing phases are focused more on design *per se*, and the reflection stage more on awareness and transfer to other writing tasks.

Written or oral reflections by students on how they attempted to realize their communicative intentions may serve two related purposes. First, they can provide evidence of design choices made and thereby facilitate assessment by teachers. Such student choices may not be clearly visible in innovative multimodal compositions. Second, they can serve to 'bring more of the dynamics of communication to consciousness' (Bazerman, 1999, p. 4; cited in Shipka, 2011). Shipka (2011, p. 112) argues that 'students who are required to produce "precisely defined goal statements" for their work become increasingly cognisant of how texts are comprised of a series of rhetorical, material, and methodological "moves" that, taken together, simultaneously afford and constrain potentials for engaging with those texts.' According to Shipka, it is important to focus such reflective activity on questions like the goals of the text and the communicative choices (including rhetorical, material, methodological, and technological choices) made to realize such goals. While our process-based model for assessment has been developed with digital video in mind, it may be possible to transfer it to other media like multimodal brochures, blogs, wikis, podcasts, powerpoint presentations, video games, and others.

Implementing such a model of assessment will depend on teachers and students developing the ability to explain how a particular selection of multimodal semiotic resources contributes to the overall meaning required for a particular genre and medium. While teachers demonstrate understanding of intermodal relationships when grading the documentaries, they nevertheless do not explicity mention the concept of 'harmony' in designing a multimodal ensemble. In order to carry out the necessary critical reflection teachers and students will need to be equipped with the metalanguage of multimodality, and, as suggested above, knowledge of the affordances of modes and media to perform particular communicative functions. On our own course in English for science, this is partly achieved by the provision of course materials that introduce both teachers and learners to the relevant semiotic resources available and to some of their potential meanings. In this article, we have seen how, in the grading process, teachers looked beyond the use of a particular resource in isolation; instead, they considered the combined effect of the use of these multimodal resources, what we can identify as 'multimodal orchestration' that creates 'harmony' by selecting apt resources that are appropriate to the genre, audience and purpose. In future, we suggest that teachers and students work collaboratively throughout the different stages of the design process so that students receive an appropriate amount of scaffolding to develop multimodal communicative competence and digital skills required in their 21st century social lives.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

Interview Questions

1 What do you look for in a digital video when you are grading it?
2 While watching select videos (one highly rated, one less highly rated):
- What do you evaluate positively/negatively in this video?
- What do you think about the visual effects?
- What do you think about the accompanying soundtrack?
- What do you think about the language used?
- What do you think about the organization and content?
- What do you think about the use of multimedia as a whole?

3 Now that we have watched the two documentaries, let's talk about grading videos in general.
- How do you feel about grading videos?
- What are the challenges of grading videos?
- What are the similarities and differences between grading videos and other assignments?
- What knowledge do you still need to grade videos?
- How easy/difficult is it to apply the criteria?
- Do you have any suggestions on how we can improve the criteria?

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