Student composition of digital animated multimodal narratives: the multimodal grammatical knowledge of students and teachers.

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The world which students inhabit is increasingly digital, multimedia and online. In order to prepare students to be effective authors in this environment, it is important to enquire as to what students and teachers know about how meaning is constructed in multimodal texts. In the context of a project to introduce middle years teacher and their classes to the composition of multimodal texts, this paper concerns questionnaires designed to gather data related to the knowledge of multimodal grammatical ideas such as genre, setting/location, characterisation, affordances of camera work and point-of-view. In the context of the project, these instruments be used as both pre-test and post-test. This paper will describe the development of the questionnaire, and the results to date (which is the multimodal grammatical knowledge claimed by participants prior to instruction), and the implications for literacy and multimedia education.

Introduction

The world which students inhabit is increasingly digital, multimedia and online. Unquestionably, students are active of a very wide range of text, including: books, newspapers, magazines, movies, radio, television, DVDs, texting, youtube, Web pages, facebook, blogs, twitter, MSN, podcasts, ipods, and online games. It has also been reported that over half of all American teens, and 57% of those who use the internet, are media creators, having published some form of multimedia such as blogs, webpages or videos (Jenkins, 2006). Yet these multimodal, dynamic publishing practices that so many children routinely engage in, and often favoured by them, are infrequently a routine component of the formal curriculum (Knobel & Lankshear, 2006).

The commitment of some Australian Education Departments (such as the Victorian Department of Education and Early Childhood Development) to provide authoring software such as Kahootz (http://www.kahootz.com) to all primary and secondary schools in their jurisdiction, has created an ideal opportunity for research and development into multimodal authoring. Kahootz is Australian-made, 3D multimedia software “designed... to empower children aged from seven to 15 to create fantastic 3D environments that incorporate animation, linking [and] sound. It provides students in the primary and secondary years with an open-ended set of 3D construction tools” (Maggs, 2008, p. 28). The Australian Research Council funded project Teaching effective 3D authoring in the middle school years: multimedia grammatical design and multimedia authoring pedagogy is such a research and development enterprise. An overview of the project and a summary of the work to date are presented by Chandler, O’Brien and Unsworth (2010), but suffice to say that it recognizes the need for, and has thus far focussed on, the development of a supportive curriculum and pedagogical framework.

This framework is grounded in what can be described as ‘grammatical design’. That is, as Kress and van Leeuwen (1996) observed in relation to still images, “just as grammars of language describe how words combine into clauses, sentences and texts, so our visual ‘grammar’ will describe the way in which depicted people, places and things combine in visual ‘statements’ of greater or lesser complexity and extension” (p. 1). In the multimodal context, ‘grammatical design’ focuses attention on how the linguistic,
visual, spatial, gestural and audio resources can be ordered and structured to make meaning. A number of studies concerning traditional/written works have demonstrated that explicit teaching of grammatical knowledge has benefited literacy development (Quinn, 2004) and the need for explicit teaching of multimodal grammatical design has been emphasised in studies of middle school students’ use of animation and digital video (Burn & Durran, 2006; Burn & Leach, 2004; Burn & Parker, 2003).

In the context of a curriculum and pedagogy which values teachers and students becoming more knowledgeable of the systems of options available for meaning-making multimodally it is important to enquire what they know both before and after instruction. This paper concerns the development of an instrument designed to gather data related to the knowledge of multimodal grammatical ideas – in particular, the self-report of the degree of knowledge of 17 multimodal design elements.

Research context

This endeavour to ascertain knowledge of multimodal grammatical ideas is in the particular context of middle years classes (10-14 year olds) who are using Kahootz to create 3D multimodal texts. By this, we mean using 3D animation software to produce a movie. Our research does not, for instance, engage students in producing an immersive environment to be explored (cf Second Life) or produce something which incorporates stereographic components. To some extent, Kahootz shares some properties with 3D virtual worlds, but our work uses it for the production of movie-style texts.

A thorough study of students and teachers learning (and learning to teach) multimodal authoring requires a sophisticated research design, but in this paper we are concerned with three research questions: (a) what do participants know of multimodal design before engaging in units of work on the topic, (b) what participants know of multimodal design after engaging in units of work on the topic and (c) whether there is any significant change which can be attributed to engaging in these units of work. In respect of these questions, the “pre-test, post-test” research design (Campbell & Stanley, 1963, p. 7) is applicable. This is represented as \( O_1 \ X \ O_2 \) where X represents an intervention (ie engaging in the units of work) and \( O_1 \) and \( O_2 \) are observations. As Campbell and Stanley are at pains to point out, this design is an inherently weak experimental approach and so conclusions in relation to (c) will need to made very cautiously – but that is work-in-progress beyond the scope of this paper. What is of interest here is the process of development of an observational instrument, and the profile of participants in relation to (a), which is the data available at the time of writing.

A further contextual issue level of knowledge the participants might have about multimodal authoring, as this would effect the sophistication of the language used in the instrument, and the complexity of the concepts explored through it. We are assuming that the neither the students nor teachers will not have any sophisticated knowledge of linguistics or grammatical design. This is an important constraint (and became, on first use a much more significant consideration than envisaged) and the implications of this are addressed later in this paper.

The discussion which follows is presented as two reasonably independent parts. Part I considers the development of the observational instrument, and part II considers what participants know of multimodal design before engaging in units of work on that topic.

Part I: Development of the observational instrument

Methodology

The development of an observational instrument used a generative approach with reference to a theoretical framework (Eisenhart, 1991). Kress and van Leeuwen (1996) and van Leeuwen (1996) provided the theoretical framework which was the starting point for a deliberate mental process related to discerning what is possible within the software. This theoretical framework is shown in a highly summarized form in Table 1.
<table>
<thead>
<tr>
<th>Types of meaning</th>
<th>Design elements through which this might be achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideational meanings</td>
<td></td>
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<tr>
<td>Narrative processes</td>
<td>Static vectors</td>
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<td></td>
<td>Dynamic vectors (motion)</td>
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<tr>
<td></td>
<td>Scene/shot sequence</td>
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<tr>
<td>Classificational processes</td>
<td>Taxonomy of scene composition</td>
</tr>
<tr>
<td>Representational processes</td>
<td>Whole/part structure</td>
</tr>
<tr>
<td>Symbolic processes</td>
<td>Visual construction participants</td>
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<td></td>
<td>Visual construction of the context</td>
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<tr>
<td>Interpersonal meanings</td>
<td></td>
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<tr>
<td>Interactional processes</td>
<td>Gaze</td>
</tr>
<tr>
<td>Social distance</td>
<td>Static framing</td>
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<td></td>
<td>Dynamicizing distance</td>
</tr>
<tr>
<td>Subjective attitudes</td>
<td>Perspective</td>
</tr>
<tr>
<td></td>
<td>Dynamicizing angle</td>
</tr>
<tr>
<td>Textual meanings</td>
<td></td>
</tr>
<tr>
<td>Truth/credibility/modality</td>
<td>Manipulation of colour attributes and context</td>
</tr>
<tr>
<td>How different elements are integrated into a meaningful whole</td>
<td>Static composition of the scene</td>
</tr>
</tbody>
</table>

Table 1: Summary of the theoretical framework

It would also be unwise for any such observational instrument to probe for knowledge of design elements not easily afforded by Kahootz. We start, therefore, by reviewing the broad spectrum of software functions of Kahootz, and from that identify the more obviously associated design elements.

Software functions

Kahootz provides the user with a range of tools to create a multimodal product. Figure 1 shows a typical screen for a user at work. The design elements available to multimedia author are presented through a set of 6 tabs on the lower portion of the screen. To understand the functionality of Kahootz, each will be considered in turn.

Figure 1: The full Kahootz workspace, showing the ‘scenes’ tab
The scenes tab

A *Kahootz* file (called an xpression) is presented as a series of scenes (refer to the 5 scenes along the lower portion of figure 1. When initially created, a new scene is entirely blank. Using the scenes tab, it is possible to select one of many ‘worlds’ on which this scene is then modelled. A selection of the ‘aquatic’ worlds are shown in figure 2. The range of worlds is extensive, but it is not possible to import additional worlds into *Kahootz*. It is possible to re-colour and re-texture (ie swatch) elements of the chosen world, along with employing lighting and fog effects. It is possible to navigate through the world using the palette of arrows shown in the top right of figure 1. This navigation through a world can be automated, as per the animation tab in figure 2. It is as if the user of *Kahootz* has a camera and it can be moved through the world, and used to take shots of different sizes and angles.

![Figure 2: The *Kahootz* ‘worlds’ tab](image)

In short, the basic element of a *Kahootz* xpression is a scene. Scenes are created by being modelled on a world found in the library, and sequenced in the timeline. The author can move through the world, as if using a video camera, interacting with that virtual 3D space and object within it. Scenes can also be re-coloured/textured and have lighting a fog effects applied.

The objects tab

Each scene can be populated with a range of objects, which – like the worlds – can be selected from the extensive in-built library, but with no provision for importing. The palette of arrows allows each object to be accurately positioned. The object can be re-sized and have its proportions changed, and aspects of each object can be re-coloured or re-textured. Objects can be animated, and the animation is of two types. There is ‘internal’ animation which are actions built into each object which they can perform ‘on the spot’; the duration, speed and direction of internal animation can be controlled, but it is not possible to create a ‘new’ animation. For example, an object which has no in-built way of juggling can’t be programmed to juggle; in that way, internal animation is a property of the object, in the same way that colour and facial features are. Along with internal animation, objects can be given an ‘action’ some of which are ‘explode’ and ‘invisible’, so that various features or activities which may or may not be typical of the real world can be endowed to the object.

The second type of animation available is keypointed animation, where each object can be controlled to move from one place to another in the virtual world. There are few restrictions on keypointed animation, and very life-like movements can be created. Each object can be shown in either close-up or distance by animating the camera into the world (see above) or by animating the object to move towards the camera.
In summary, objects can be chosen from the library and added to a scene. The author can position the object precisely in virtual space and be re-coloured/textured, re-sized, re-proportioned and animated.

**The Sounds tab**

In addition to adding visual objects to a scene, audio objects can be added. There is an extensive library of sound effects, but it also possible to record or import other audio objects (which maybe another sound effect, or dialogue, voiceover or music). Aspects of each audio object can be manipulated slightly, by specifying volume, pitch, echo, tremolo and duration. Audio objects are positioned on a timeline of the scene, and multiple audio objects can overlap one other. However, audio objects are entirely contained within a scene, so that backing music would need to be subdivide into sections for each scene.

**Notepad and Movie tabs**

The notepad tab give access to the creation of a particular type of object – 2D or 3D text (think ‘titles and credits’), which can be controlled in the same ways as other objects.

In a Kahootz xpression which consists of several scenes, there are several ways to (fairly automatically) move from one scene to another. In the case of creating a linear text, this can be achieved by setting the duration of each scene (see Figure 1). With this done, the visual and audio ‘action’ can be converted to a movie file, and the controls for this are accessed through the movie tab.
Having reviewed the most apparent of the software functions of Kahootz, we now move to describe the design elements which correspond with these.

**Design elements**

Having explored and reviewed the software functions, the next stage of the generative process was to tabulate those and correlate them with the types of meaning presented in the theoretical framework. This is shown in Table 2.

<table>
<thead>
<tr>
<th>Software function</th>
<th>Design element</th>
<th>Type of meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of worlds, colouring/texturing worlds and objects</td>
<td>Setting and location</td>
<td>Symbolic processes</td>
</tr>
<tr>
<td>Colour/texturing worlds, lighting effects, fog effects</td>
<td>Atmosphere and mood</td>
<td>Symbolic processes</td>
</tr>
<tr>
<td>Availability of an in-world camera</td>
<td>Sizes of camera shots</td>
<td>Social distance</td>
</tr>
<tr>
<td></td>
<td>Camera distances</td>
<td>Social distance</td>
</tr>
<tr>
<td></td>
<td>Camera movement</td>
<td>Social distance/Subjective attitude</td>
</tr>
<tr>
<td></td>
<td>Camera angles</td>
<td>Subjective attitude</td>
</tr>
<tr>
<td></td>
<td>Point-of-view</td>
<td>Subjective attitude</td>
</tr>
<tr>
<td>Selection of objects, colouring/texturing of objects</td>
<td>Characters</td>
<td>Symbolic processes</td>
</tr>
<tr>
<td>Availability of recorded audio</td>
<td>Voice performance</td>
<td>Narrative processes</td>
</tr>
<tr>
<td>Sound effects library, availability of voice performance</td>
<td>Sound effects</td>
<td>Symbolic processes</td>
</tr>
<tr>
<td>Sequencing of scenes</td>
<td>Sequence and continuity</td>
<td>Narrative processes</td>
</tr>
<tr>
<td>Explosions, fades and animations</td>
<td>Special visual effects</td>
<td>Symbolic processes</td>
</tr>
<tr>
<td>Availability of on-screen text, visual elements and audio elements</td>
<td>A balance between sound, image and print</td>
<td>Compositional processes</td>
</tr>
</tbody>
</table>

**Table 2: Design elements easily accessible to inexperienced Kahootz users.**

There are several design elements of the analytic framework which are not available within Kahootz. The most notable of these is the lack of control of participant’s eyes. Also, the manipulation of colour attributes is relatively crude. Therefore, other techniques need to be deployed so that interactional processes and modality can be represented effectively. In addition, an entirely continuous audio track (ie music or sound effects) is not possible (there is necessarily a break when Kahootz transitions from one scene to the next).

The generative approach has led us to consider certain design elements are relatively sophisticated (entailing some difficulty in both achieving these and also working out ‘why’ one might seek to deploy them). These include the scene composition including a construction which is deliberately taxonomic, use of compositional zones and the dynamicizing of scenes in space and time. Therefore, Table 2 represents the design elements with which a relatively inexperienced user of Kahootz may realistically encounter. The design elements represented there form the basis of an observational instrument.

Before moving to the design of the instrument, several features of the preceding analysis should be observed. Firstly, Table 2 does not seek to present a precise correlation between software function and
design element. Rather, it is a list of the design elements which are most likely to be encountered by an inexperienced user of Kahootz as they encounter the basic functions provided through the software. It is worth noting that software function and design element is not inherently related, as it is the multimodal author who uses a particular software function to achieve a particular result. For instance, use of the camera could realise several design elements. Similarly, a design element could be realised by a range of software functions – whilst it might be more obvious to arrange a close-up by bringing the camera closer to the object, in a virtual world it is quite possible to bring the objects closer to the camera.

Secondly, there are some “gaps” in the immediately-available meaning-making capabilities of Kahootz. That is, as an inexperienced user of Kahootz encounters the basic functions provided by through the software, they are most likely to find software functions which readily allow meaning to be made with respect to symbolic processes, social distance and subjective attitudes. They are less likely to stumble into a full range of techniques to allow them to make meaning in relation to narrative processes, and capacity for making textual meaning and portraying interactional processes are even less likely to be encountered. That is not to say that a full range of meanings cannot be made, but that the design of the software readily introduces the budding multimodal author to a certain range of meaning-making devices, but for the full range, the author needs to be more intentional and work a little harder. As we are presuming little experience with either the software or semiotics, we deliberately skew the observational instrument to explore user’s knowledge of the multimodal design elements which the software seems to be “naturally good at”.

Related to this is the third observation, and that is that this list of design elements is overwhelmingly visual. Whilst Kahootz certainly provides audio facilities, we have limited our consideration to the visual mode as it is the more ‘obvious’ mode in which to be working, and to restrict the number of design elements to that which is manageable for middle school students.

We now proceed to discuss an observational instrument to gauge knowledge of these design elements.

**A Likert-like scale for the knowledge of multimodal design elements**

As Dunn (2009, p. 162) notes an interval rating scale, commonly referred to as a Likert scale, is the most typical and familiar scale in questionnaires. Such a scale:

- relies on respondents making numerical choices in order to reflect some reaction to a stimulus question, and
- presumes that people’s opinions fall on a continuum and are not clustered together at one or the other extreme

A scale such as this is not strictly a Likert scale. A true Likert scale (Dunn, 2009, p. 164; Oppenheim, 1992, p. 195) is concerned with the production of a bank of items designed to assess attitude towards a single given phenomenon, and there is a rigorous process of development of a substantial bank of items for this purpose.

What has been designed is a series of interval rating scales (a ‘Likert-type instrument’), each of which elicits respondent’s self-report of their knowledge of a multimodal design element. An example of such an item is as follows:

| How much do you know about the different genres of multimodal texts (e.g. narrative, recounts, biography, documentary). |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

I have a limited understanding of this

I have a good understanding of this
The design elements identified above have been formed into items concerning:

1. the different genres of multimodal texts (e.g., narrative, recounts, biography, documentary)
2. how a narrative structure is made up of different parts (e.g., orientation, complication, evaluation and resolution)
3. the use of location and setting to help tell a story
4. the use of atmosphere and mood to help tell a story
5. the use of different sizes of camera shots (e.g., close-ups, mid shots, wide shots) to help tell a story
6. the use of different camera distances (e.g., close-up, mid shot, wide shot) when showing characters to help tell a story
7. the use of different camera movements (e.g., zoom, pan, track) to help tell a story
8. the use of vertical camera angles (e.g., high angle, low angle, eye level) to help tell a story
9. the use of horizontal camera angles (e.g., oblique, front view, rear view) to help tell a story
10. the choice of different points-of-view for camera shots to help tell a story
11. the use of visual elements to convey information about characters
12. the use of voice performance (including dialogue and voice over) to help tell a story
13. the use of sound effects to help tell a story
14. the use of special visual effects to help tell a story
15. the working out of a balance between sound, image and print to tell a story
16. the importance of continuity in multimodal texts
17. the importance of the sequencing of story in multimodal texts

Two additional items were added which relate to process and approach to the creation of multimodal texts:

18. the revision to, and improvement of, multimedia work before it is considered ‘finished’
19. the extent to which creativity is encouraged when writing stories

**The student and teacher questionnaire**

For a student questionnaire, items were phased and presented in the following manner of the example above – 19 items of this form with the stem “How much do you know about the ways we can use … to tell a story.”

For teachers, a recognition of their knowledge is important, but more so is the extent to which they emphasize each design element in their teaching. So for the teacher questionnaire, items were phased and presented in the following more complex form:
To what extent do you teach your students about the different genres of multimodal texts, such as narrative, recounts, biography, documentary, etc?

I have an understanding of what this means
- Yes
- No

The extent to which I emphasize this in my teaching of reading/viewing is:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I place insignificant emphasis on it</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I emphasize this to a significant extent</td>
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</tbody>
</table>

The extent to which I emphasize this in my teaching of writing/creating is:

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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I place insignificant emphasis on it</td>
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<tr>
<td>I emphasize this to a significant extent</td>
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</table>

For the teacher questionnaire, some open responses were also presented in relation to several items, as follows:

2. narrative structure
   What is your understanding of the nature and role of the “evaluation” element in narrative structure?

4. atmosphere and mood
   What is your understanding of the ways in which colour/lighting can be used to create a particular atmosphere or mood?

5. sizes of camera shots
   What do you see as the purposes for using different shot types?
   What is your understanding of the effect of close-ups/mid shots/long shots when human, human-like or animals are depicted?

7. camera movements
   What do you see as the purpose for using camera movement in multimodal authoring? Consider zoom, pan and track.

8. vertical camera angles
   What do you see as the purpose for using vertical camera angles in multimodal authoring? (Consider high angle and low angle.)

9. horizontal camera angles
   What do you see as the purpose for using horizontal camera angles in multimodal authoring? (Consider oblique, frontal and rear angles.)

10. different points-of-view
    What is your understanding of the range of possible points-of-view that could be constructed?
    What is your understanding of the effect on the view of the audience points-of-view that you have listed?

12. voice performance
    What is your understanding of the ways in which voice performance can be used to create meaning?
15. balance between sound, image and print

What is your understanding of how language, image and sound work together to tell stories? Can you briefly give an example of this?

Design issues

The primary consideration is whether respondents’ choices along the continuum reasonably reflect some reaction to a stimulus question. There would seem to be no in-principle reason to presume that this would not be so. A subsequent consideration is whether respondent’s opinions fall on a continuum or are clustered together at one or the other extreme. In fact, there is no available data on which to base an assessment of this, and early uses of this instrument will provide some bases for making an assessment of this in preparation for subsequent use.

A major consideration is whether the language is sufficiently accessible to both teachers and students. In relation to students, the developers went through several iterations of revision to the phrasing of the items. The items were then shown to a small group of children younger than the target age-group, and then further revisions were made. An initial group of students then completed the questionnaire, and a great deal of angst was reported. This resulted in a further simplification of the wording (in the form presented above) including the use of the “Flesch reading ease score” built into Microsoft Word. This current revision was also accompanied by guidelines for teachers when supervising groups of students completing the instrument (see Appendix).

The major complaint seemed to be that certain terms, such as “multimodal authoring”, “vertical camera angles”, “points of view” or “balance between sound, image and text” were unfamiliar to the students. In a pretest-posttest design (see below), it is not surprising that such terms were unfamiliar as they, in all likelihood, had not been taught as yet. So the advice in the guide to teachers that ‘if the words are unfamiliar, you should probably respond with a low score’ was intended to counter this. And yet in the first cohorts using this instrument, there is evidence (see below) of response bias, where respondents don’t want to be seen as unknowledgeable as so respond with a mid-range score (Dunn, 2009, p. 163). A possible response to this, for a future revision of the instrument, would be to use a scale with an even number of responses to force respondents to come down on one side or the other of the issue, as recommended by Dunn (2009, p. 163). An implication of this is that, after the first uses of the instrument, the issue of whether responses may theoretically be well distributed along the continuum is not something about which a judgement can be made because of the response bias effect.

Validity – whether the instrument does which it claims to do – is an important consideration of any research instrument, and several forms should be considered: face validity, internal validity, external validity and construct validity (Dunn, 2009, pp. 253, 236). Face validity concerns whether it seems to assess what it was designed to assess. It certainly seems that the instrument probes the knowledge of certain multimodal design elements. Given the concern over the language, it is possible that students made responses to any of the times which reflected something completely different to a genuine self-assessment of their knowledge of design elements.

Construct validity refers to whether the independent and dependant variables adequately represent the theoretical construct under consideration; in other words, can it be established that a knowledge of multimodal design elements can be adequately explored using Likert-type scales. This has not been explored in our research so far, and so for the present purpose is simply presumed to be true. One way to explore that would be to compare the way participants talk about their knowledge (for instance, in an

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2 Initial form of the items was “How much do you know about the ways multimodal authors use … to help tell a story” 
Latter form of the items was “How much do you know about the ways we can use …. to help tell a story”. 
The ‘low’ side of the Likert scale was also changed from “I have a limited understanding of this” to “I have not understanding of this”. 

interview or in ethnographic observation) with their profile as presented through this questionnaire instrument.

Internal validity refers to whether the research reveals the hypothesized causal relationships. As the no causal relationships are hypothesized, this is not relevant for the present purpose. External validity refers to whether the sample can be used to make predictions and draw conclusions about other populations. This is relevant for the profiling of participants which is described in Part II.

Having discussed the development of the observational instrument, we now move to present a profile of participants in a study where this instrument has been first used.

**Part II: Knowledge of participants prior to instruction**

**Research Question**

In the context of a project to introduce 3D multimodal authoring with *Kahootz* to teachers and students, we consider this one research question: what do participants know of multimodal design before engaging in units of work on the topic.

**Method**

A questionnaire (as described in Part I) was prepared in an online format (using googledocs). Teachers were sent a links to this survey, and teachers (n=27) and students (n=322) completed the survey online. Results were collected and downloaded, and an analysis was prepared using Microsoft Excel.

**Results: Teachers**

Results for the teacher survey asking “do you have an understanding of what this means” are shown in Table 3. Responses were tested for statistical significance using the sign test (Owen, 1962, p. 362-363); the responses for only 5 items were statistically significant (p<0.01).

These results indicate that this sample of teachers do teach about the need for revision and improvement of multimodal texts, and expect students to be innovative in their story telling. They do not know about camera angles, points-of-view and continuity in multimodal texts. Perhaps the most surprising (and worrying) finding is that for these teachers (representing 3 Australian states) there is no tendency to teach about different genres or the structure of text-types. Concerning all other aspects of multimodal authoring, it is ambivalent: some claim to know about each element, others claim not to.

The follow-up items in the teacher questionnaire “the extent to which I emphasize this in my teaching of viewing/reading” and “the extent to which I emphasize this in my teaching of writing/creating” would be extremely interesting to pursue. However, they are not part of the present analysis.
<table>
<thead>
<tr>
<th>Item</th>
<th>I have an understanding of what this means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1. To what extent do you teach your students about the different genres of multimodal texts</td>
<td>14</td>
</tr>
<tr>
<td>2. To what extent do you teach your students about how a narrative structure is made up of different parts</td>
<td>14</td>
</tr>
<tr>
<td>3. To what extent do you teach your students about the ways multimodal authors use location and setting to help tell a story</td>
<td>17</td>
</tr>
<tr>
<td>4. To what extent do you teach your students about the ways multimodal authors use atmosphere and mood to help tell a story</td>
<td>15</td>
</tr>
<tr>
<td>5. To what extent do you teach your students about the ways multimodal authors use different camera shots to help tell a story</td>
<td>15</td>
</tr>
<tr>
<td>6. To what extent do you teach your students about the ways multimodal authors use different camera movements to help tell a story</td>
<td>12</td>
</tr>
<tr>
<td>7. To what extent do you teach your students about the ways multimodal authors use different camera angles to help tell a story</td>
<td>8</td>
</tr>
<tr>
<td>8. To what extent do you teach your students about the ways multimodal authors use camera angles to help tell a story</td>
<td>6</td>
</tr>
<tr>
<td>9. To what extent do you teach your students about the ways multimodal authors choose different points-of-view for camera shots to help tell a story</td>
<td>13</td>
</tr>
<tr>
<td>10. To what extent do you teach your students about the ways multimodal authors use visual elements to convey information about characters</td>
<td>13</td>
</tr>
<tr>
<td>11. To what extent do you teach your students about the ways multimodal authors use voice performance to help tell a story</td>
<td>17</td>
</tr>
<tr>
<td>12. To what extent do you teach your students about the ways multimodal authors use sound effects to help tell a story</td>
<td>13</td>
</tr>
<tr>
<td>13. To what extent do you teach your students about the ways multimodal authors have to work out a balance between sound, image and print to tell a story</td>
<td>10</td>
</tr>
<tr>
<td>14. To what extent do you teach your students about the importance of continuity in multimodal texts</td>
<td>7</td>
</tr>
<tr>
<td>15. To what extent do you teach your students about the sequencing of story in multimodal texts</td>
<td>13</td>
</tr>
<tr>
<td>16. To what extent do you teach your students about the need to revise and improve multimedia work before it is considered ‘finished’</td>
<td>21</td>
</tr>
<tr>
<td>17. To what extent do you expect, and support, your students to be innovative in their story-telling?</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 3: Teacher knowledge of multimodal design elements (n=27)

*items in bold significant to p<0.01*

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3 The original two items referring to “sizes of camera shots” and “camera distances” were combined into this one item.

4 The original two items referring to “horizontal camera angles” and “vertical camera angles” were combined into this one item.
Results: Students

Results for the student survey are more complex to analyse than those of the teacher survey because students rated their level of understanding on a five point scale rather than a two point scale, so we present the profile of the student population (n=322) descriptively. In so doing, we acknowledge that a detailed analysis of these results, including an analysis of any between-school or between-class trends are a work in progress.

So far as it is meaningful to sum the 18 scores for each student into an aggregate total, these are presented in Figure 5. These results suggest that students’ self-report of knowledge of multimodal design elements is relatively poor.

![Figure 5: Aggregated totals for each student](image)

A large number of items, however, clustered in the following type of way, as shown in Figure 6. The only variations to this are discussed below. It could be suggested that this type of response is evidence of response bias, where respondents don’t want to be seen as unknowledgeable as so respond with a mid-range score (Dunn, 2009, p. 163).

![Figure 6: Student knowledge of "atmosphere and mood" as an example of central tendency](image)

Items where there results are skewed to the right (ie a tendency towards students claiming “good understanding”) were: ‘knowledge of genres and text types’ and ‘knowledge of narrative structure’. This trend is very noticeable relating to “being creative when composing stories”, and slightly so in relation to a commitment to review and improvement.
Discussion

What is clear from these results is that neither the teacher nor student population is consistently knowledgeable (or not knowledgeable) about relevant design elements. As at least 50% of the student items present a response bias towards a central tendency which may reasonably interpreted to students not wanting to be seen as unknowledgeable, it is not unreasonable to postulate that students are teachers are, in general, not knowledgeable about multimodal design elements.

For some design elements, it is much clearer that teachers and students have more to learn. Use of camera angles is an area which both groups are not clear about. Teachers are not certain about point-of-view, and one therefore wonders whether the student results are suffering a response bias. Students seem to be uncertain about balancing meaning between the multiple modes, awareness of continuity and sequencing, and one wonders whether the number of teacher respondents is too small to show a significant result which actually be present.

Curiously, students tended to claim ‘knowledge of genres and text types’ and ‘knowledge of narrative structure’ whereas the trend was not significant for teachers. Perhaps the best explanation for this is related to the small sample size of the teacher cohort, and the real possibility that students may have learnt this from other teachers. Teachers value students working to review and improve their work, but students don’t overwhelmingly report doing this. There is reason, therefore, to suggest that teachers should re-double their efforts in establishing this as a culture in their classrooms.

There is a significant trend for both teachers and students to value creativity in student storytelling. This is perhaps the most general item in the questionnaire, and the results for it are the most statistically significant. It is clear that this is a shared goal in the classrooms. The point of establishing a study in the
context of grammatical design is to foster knowledge of the particular design elements which would lead to realising this goal, and so these data provide support for this broader endeavour.

External validity – whether these data can be used to make predictions and draw conclusions about other populations – is an important consideration. In this case, research design and the statistical analyses employed do not allow such inferences to be drawn. The above results and discussion are very particular to a specific group of teachers and students. We have been able to profiles something of what these participants know of multimodal design before engaging in units of work on the topic, but that is the extent of the conclusions which can be drawn.

Conclusion

This paper has firstly reported on the development of an observational instrument for to probe for teacher and student knowledge of multimodal design elements, namely a Likert-style questionnaire. This instrument is based on the immediately-available meaning-making capabilities of Kahootz software, assuming little or no knowledge of linguistics or grammatical design.

In so doing, we have identified that the software itself is somewhat skewed towards helping the multimodal author make meaning with respect to symbolic processes, social distance and subjective attitudes. Techniques for making meaning in relation to narrative processes, textual meaning and portraying interactional processes are less likely to be encountered. Audio facilities are available, but building an association between “how” and “why” is not explicitly supported by the software.

Initial deployment of the instrument has revealed concerns over questionnaire language, which proves hard to simplify, and a response bias (which may be related to this) of central tendency. Both construct validity and face validity of this instrument have been discussed. It has not yet been established, in principle, whether that knowledge of multimodal design elements can be adequately explored using Likert-type scales, but we presume there is validity in making this connection. Given the concerns over language, whether it seems to assess what it was designed to assess (face validity) is somewhat unresolved, as some responses may be answering unstated question “do you understand this question” rather than the item as specified.

The instrument has been used in a restricted way to profile the knowledge of multimodal design elements of an initial cohort of teachers and students. A few statistically significant results can be identified, and the overall sense is that – for this cohort – knowledge seems to be quite low and of a general nature. Further detailed and generalisable analyses are the subject of work in progress.
References


Appendix 1: Instructions for teachers for administration of the student survey

This questionnaire asks students to consider their knowledge of story telling through film-making, or using programs such as Kahootz for this type of activity.

In such a survey, there will inevitably be terms that your students may not be familiar with. This IS the initial survey prior to a sequence of class work that will expose them to these terms and understandings. It is expected that for many students the appropriate response at this time is "I have no understanding of this". This response is perfectly OK and in no way casts aspersions on your students or yourself.

At the commencement of the questionnaire, please orient students to its purpose and to the method of filling it in. They need to be in the 'mental space' of story telling through film-making. They need to be aware that "I have no understanding of this" is an acceptable response, because they will learn about these things later.

Please feel comfortable to read aloud the questions/items for your students if they need this. It is appropriate to also provide a simple clarification of terminology, without giving 'the answer', if necessary. An example of a simple explanation would be "a camera movement is when they zoom in or zoom out". A more detailed or lengthy explanation would be inappropriate for an initial survey, but could form part of your teaching at a later time.

It may be helpful for you to read over the questionnaire prior to asking your students to complete it. For some classes, completing it in small groups rather than as a whole class activity may be best.

We are conscious of the literacy demands of a survey such as this, and have endeavored to use accessible language as much as possible.

Please feel to be in touch with the researchers to clarify any questions or issues which may arise.