

USING VISUALS TO PROMOTE WORKPLACE LITERACY AMONG POLYTECHNIC STUDENTS

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ABSTRACT

The 21st century is saturated with visuals and texts that are mediated through the Internet, mobile phones, videos, films, advertisements and games. These new media with integrated visuals are part of popular culture. The students in Politeknik Sazali Ahmad Shah were found to have difficulties in reading visuals and manuals and communicating their ideas in their workplace during their industrial training. Hence, this qualitative descriptive case study looked into a new approach of teaching English for Technical Purposes to polytechnic students by the use of visuals such as drawings, digital photographs, flow charts and video clips to promote workplace literacy. Students are required to comprehend and make meaning from the visual images and present their PowerPoint presentations. This case study examines four Civil Engineering students. Sources of data for this study consist of field notes, students' task output, video recordings, descriptions of the lesson and interviews. The study found that the students utilized and made meaning of the visuals by using iconic signs to signify their interpretation of texts and identify elements from video clips to construct their workplace tasks. They analyzed each video element according to Kress' principle of aptness and plausibility of the visuals. The students also perceived that by learning their field content, they can perform and communicate better in their industrial training due to the exposure to lexical items, ability to think critically, retain in long term memory, and express their arguments in deciding the appropriate descriptions for the visuals.

Introduction

The dramatic changes in "postfordism" and "fast capitalism" (Gee, 1994 in Cope & Kalantis, 1997) have brought about an inevitable effect on how literacy is to be taught and why literacy pedagogy has to be changed. The languages needed to make meaning are radically changing and will continue to change in years to come, especially in the working life of our students. The dramatic global economic change has given rise to the emergence of new business and new management theories and practices across the developed world. These theories and practices stress competition and markets, centering around change, flexibility, quality, and distinctive niches all of which have given rise to the replacement of the old division of labour with its minute, deskilled components to "multi-skilled" all-round workers who are flexible enough to be able to do complex and integrated work (Cope & Kalantis, 1997).

With the new work life emerges a new language, the result of new technologies, such as the iconographic, text and screen-based modes of interacting with automated machinery. The influence of these technologies has evolved a world of meanings that are multimodal and in which the written linguistic modes of meaning are part and parcel of visual, audio and spatial patterns of meaning (Cope & Kalantis, 1997). Goodman and Gradol (1996) in their discussion of visual English have also illustrated the role of typographic variation in representing multiple voices in texts and the increasing use of what they call visual puns that require the interaction of visual and verbal elements to bring meaning to the fore.

Due to these changes and interactions, Kress (2003) asserts that literacy learning needs to be reconsidered in the new media age. Literacy cannot be treated as the “sole, the main, let alone the major means for representation and communication” (p.35). Other modes such as images or visuals may be more prominent and significant in many environments where writing and reading occur. He claims that the co-presence of other modes raise the question of whether they replicate what language does or whether they have other roles due to their constitution, their make-up or their affordances. He proposes a theoretical change from linguistic to semiotic—from a theory that accounts for language alone to a theory that can account equally well for gesture, speech, image, writing, 3D objects, colour, music and images based on the notion of a sign (a representation), which is the result of the combined actions of the signified (the concept, the referent) and the signifier (material, sound, gesture) on each other that form their marriage, the sign (the thing that it represents).

With respect to the mentioned new literacy learning needs and future workers' competency needs in “acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, using computers to process information” (Norazman Abdul Majid, 2003, p.157), students in Polytechnics need to be trained to read, interpret and communicate their ideas using visuals. They will also need to present their progress and process reports using videos and still pictures to illustrate their points and ideas during corporate meetings in their future workplace. Lack of knowledge in interpreting and communicating with visuals and texts in their field of study will hinder their communicative ability. They will tend to be reticent when it comes to communicating and expressing their thoughts and ideas in English (Hairuzila Idrus & Rohani Salleh, 2008)

Multiple studies (Rakes, 1995; Yang, Q, 2001; Seliman, 2002; Shameem Rafik-Galea & Muhammad Kamarul Kabilan Abdullah, 2003; Kang, 2004) have revealed the benefits of using visuals to enhance learning. With the development of computer assisted learning and technology, it is now possible to integrate static and animated pictures into an interactive learning environment and produce multimedia presentations to express as well as communicate in the workplace.

The Use of Visuals in Learning

Visuals play a vital part in learning. They provide a wealth of information that both reinforces and supplements the text content. The value of visuals is well expressed by the saying “a picture paints a thousand words” (Buckeridge, 1995, p.48), and studies (see Mayer, 1980; Levie & Lentz, 1982; Crack & Lockhart, 1972 Rakes, 1995) have also indicated this importance. Rusted and Hodgson (1985) in Rakes (1995) are also of the opinion that pictures which are congruent with the text have generally been found to enhance performance, particularly of textual information mirrored in the picture. Visuals tend to be used more with beginner or elementary classes. The general consensus is that poor students tend to derive greater benefit than good readers. However, there is also a view that the advanced class benefits more.

A study conducted by Kirsch and Jungleblut (1986) indicated that advanced classes or older students are not necessarily proficient in using and interpreting visual displays (in Rakes, 1995). Therefore, according to Friedman (1979), students need guidance from specially trained teachers in order to see, interpret and use illustrations. In this way students’ attention will be directed to relevant content. In the present study, visuals derived from computer technologies are used to enhance students’ literacy and communication skills.

The use of visuals in English Language Teaching (ELT) and English for Specific Purposes should be advocated to enhance learning. Visuals in many forms are vital to promote literacy in the workplace or during presentations at professional meetings. Visuals are essential in order to ensure the clarity of many kinds of information to the audience. In a professional presentation, especially in Civil Engineering, visuals are mandatory. Visuals may be likened to the trunk of a tree that supports everything else because important information can be exactly conveyed visually when even a precise verbal description may not be adequate. (Seliman, 2002). This is also mentioned by Kress (2003) who states that “the world narrated” is a different world to “the world depicted and displayed” (p.15).

Related literature reveals abundant evidence of positive value of visuals in learning. Dwyer (1978) in Yang (2001) also concludes that visuals need to be simple and highly related to the text. If the pictures, for example, were unrelated or too complex, they might be distracting. If visuals are too rich in detail, the learners would need to spend more time to systematically scan the visuals, and consequently they might ignore them to save time. General conclusions made from previous research studies on the use of visuals include: i) visuals help enhance memory better than text only, and (ii) visuals added to text facilitate learning if they are congruent with the learning task.

Cazden (2004) advocates the idea of multimodalities which support language learning and understanding—not just listening to words but with the simultaneous support of visuals. She also emphasizes the use of multimodal support through video tapes. As language educators, we cannot ignore the educational significance of visual learning and communication due to the fact that “the way we learn bears a strong relationship to the way our senses operate” and a very high proportion of all sensory learning is visual” (Avgerinou & Ericson 1997, p. 287). Nowadays we are moving into an era in which visual literacy is as important as language or textual literacy. In this new reality, our ability to communicate ideas visually is as important as our ability to conceive them. As a result, teachers should explore the potential of using visuals to help student to acquire structural knowledge in their content area. Visuals are helpful in second language instruction because visually expressed ideas can help learners compensate for their language deficiencies and get their ideas across more easily.

Lacy identifies six goals of using visuals that are applicable in today’s world (cited in Rezabeck, 2005). These goals underscore the crucial role of visuals in promoting thinking, learning, communication, tolerance, creativity and responsible citizenship in a diverse and inundated world society. Firstly, students become more creative and critical thinkers by identifying, analyzing, interpreting and evaluating what they see. Secondly, they become visual makers themselves, demonstrating the ability to create mental images and to communicate visually with others. Thirdly, they will also be more perceptive individuals by recognising and appreciating the aesthetics of visual imagery and by understanding, accepting and valuing personal, cultural and historical differences in image creation. Fourthly, they become more responsible citizens by being aware of the roles of visuals in reflecting and influencing a society. Next, they also become more discriminating consumers, through understanding the motives, methods and emotional appeals of advertising visuals in modern society. Lastly, students become lifelong learners with a positive attitude towards learning how to learn about visual images. These goals outline knowledge, skills and attitudes crucial for success in a world saturated by visual images. Being visually literate enables students to appreciate and communicate accurately and helps them appreciate and accept diversity of culture and visual expression. It also helps them to discern and discriminate what visual messages to use.

Thus, this case study aims to investigate how polytechnic students utilize and make meaning from visual inputs to explain their workplace tasks, and what their perceptions are towards the use of visual images to promote their workplace literacy skills.

Problem Statement

According to Clarke (1979), a reader will not be able to read effectively until he develops some proficiency in the target language. If an adequate level of proficiency

is not achieved, then there is a need for materials such as visuals to mediate the meaning-making process of students.

Students at the institution in this study were observed to lack reading ability when they accessed the Internet for information. They would copy, cut and paste any information they retrieved from webpages without comprehending what they read. Their inadequate proficiency hindered them from choosing appropriately when doing their assignments and conducting oral presentations in class.

Besides this, with the saturation of images and iconic representations on the Internet and mobile phones as well as manuals in the workplace, students not only needed to decipher text but also images to make sense of what was read and communicated to others. Hence, this study primarily explored the use of visuals to elicit talk about visual stimuli that will provide entry and access to workplace literacy. The visuals used were expected to activate and enhance students' thinking and knowledge in their specialized field which is Civil Engineering.

Making Meaning from Visuals

In thinking of literacy in the new media age, Kress (2005) has proposed that we look into the theoretical change from linguistics to semiotics. The concepts of meaning are associated with concepts such as learning and creativity. In semiotic theory, concepts such as representation and communication, and interpretation and articulation are considered (see Figure 1).

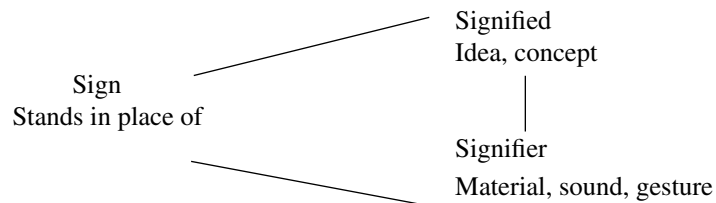


Figure 1: Semiotic theory

In semiotic theory, the sign, which stands for the "thing" it represents, is the result of the relationship formed between the signifier and the signified. It is the joining of concept and material through a historical, social and cultural process that creates meaning. Language in use, both visual and non-visual, in this semiotic model, sets the meaning of the sign. From this historical perspective the meaning of the sign appears to be natural. We do not normally think about the constructed nature of words and the meanings assigned to them as we read a text. The reader of the text,

as well as its producers, from a semiotic model of communication, reproduce the already fixed and existing meaning of the sign (Hawkes, 1977; Muffoletto, 1990; Weedon, 1987 ; Moore, 1994)

The sign has meaning because of its historical use in practice resulting in a seemingly fixed meaning, which has become part of a system of signs or codes. Signs have been organized around three basic categories: iconic, indexical and symbolic. Iconic signs, like photographs, hold a perceptual and technical relationship to experienced reality. Signs become meaningful because they “look like” what they depict and have become more meaningful to the reader of the text through their experience with other social texts. Indexical signs refer to something else in an abstracted or conventional manner. Thus the symbol on a road sign may not look like a railroad crossing but “we” must all agree that it refers to one. The symbol, as Langer (1942, p.307) suggests, is an “instrument of thought.” It refers to a broader universal concept. For example, a picture of a flag may denote a flag, but it also refers to the spirit of nationalism as well as liberating or repressive government powers.

Signs are further organized into systems of meanings or codes. Codes create the context and set the limits for the production and reception of the text. It is the produced text, the production of intentions that is experienced by the reader of the text. In this way, signs appear to mean what they do because of their context - their relationship to other signs within the coding systems.

Based on social semiotics in a multimodal environment, Kress (2003, p.140) sees the sign and meaning making of signs in a different perspective. He stresses that we need to understand how meanings are made into signs in distinct ways in specific modes, as the result of the interest of the maker of the sign, and also find ways to understand and describe integration of such meanings across modes into coherent wholes or texts. In contrast to the dominant view, the assumption is that the relation between form and meaning, signifier and signified, is never arbitrary, but is always motivated by the intent of the sign to find the best possible and most plausible form of expression of the meaning that one wishes to express.

Representation and communication

In the contemporary approach, the commonly held assumption is that articulated rationally based communication and representation take place through the medium of language, but in Kress’ approach (2003), communication is multimodal and it is assumed that a descriptive framework has to be derived from the specific characteristics of the mode itself. For instance, the temporal succession of elements

in speech leads to another set of possibilities for representation, and on the other hand, the spatial simultaneity of elements leads to another. Whatever written text that is displayed on the screen is now treated as a “visual entity” (Kress, 2003, p.44) which has meanings, and the organizational features of the elements such as the placement of the visuals also have their meaning effects.

Layout of Elements

The placement of the elements of images and writing expresses principles of visual grammar through which the signs are organized. This visual grammar draws from the semiotic theory of Michael Halliday which states that:

Any fully functioning human semiotic resource must have the potential to meet three demands: to represent states of affairs or events in the world -the ideational function; to represent the social relations between the participants in the process of communication - the interpersonal function; and to represent all that as a message entity, a “text” which is internally coherent and which coheres with its environment - the textual function. (Kress, 2003, p.66)

In other words, in the ideational function, the visuals are able to represent objects and their relations in a world outside the representational system. In the interpersonal function, the visuals are able to project the relations between the producer of signs and the receiver of those signs. That is, any semiotic resource has to be able to project a particular social relation between the producer, the viewer and the object represented. As in the textual function, the resources or visuals have the capacity to form texts and complexes of signs which cohere both internally and with the context in or for which they are produced.

According to Kress (2003, p.40) too, semiotics has been the domain of two large schools of thought by Swiss linguist Ferdinand de Saussure and American philosopher Charles Sanders Pierce. De Saussure claims that the sign is an arbitrary combination of form and meaning, of signifier and signified which is sustained by forces of social convention. In a quoted example usually used by de Saussure, he says that even though the objects in the world referred to by the “word *tree* in English or *arbre* in French is the same object”, the sounds form representing this same object in both languages are different, proving that the relation of form and meaning is an arbitrary one. Kress (2003) argues that de Saussure’s formulation of level of meaning is mismatched with the level of sound where meaning is thought to be realized by sound. However, the matching of signified and signifier is always like with like and of realization is like with alike.

Unlike de Saussure, Pierce's semiotic focused on "what the sign represented, on the object/referent in the world, on how it was interpreted, assuming there was no meaning until there was an interpretation" which was termed "interpretant". He consequently distinguished between:

...iconic signs, which in their form parallel the meaning of the signified—the drawing of flames to mean fire; indexical signs, in which there is a relation of 'consequence', as in smoke signaling combustion; and symbolic signs, where the relation between form and meaning was largely sustained by convention---red cross of the Red Cross. (Kress, 2003. p.42)

In the use of the concept of sign, Kress (2003) advocates that the relation of the signified and signifier are always motivated and not arbitrary as de Saussure suggested earlier. He refutes de Saussure's claim and says that the shape of the signifier (material, sound, gesture), its "form" in whatever way, is chosen because of its "aptness" for expressing what is to be signified. He uses Pierre's "iconic sign" as the model of all relations of signs to their referents.

Kress (2003) also argues that a new theory of meaning cannot evolve without the concept of transformation which explains how the "modal resources" (p.40) allow the users of visuals to transform and change their shape or form according to the sign-makers' needs and interests. In this approach, every sign is the production of a new metaphor brought about through the process of analogy. As such, there is no mere sign use or reuse of metaphor but the constant transformation of existing signifier resources and the constant making of new metaphors. This process is guided by the interests of the sign-maker so that both the sign-makers' perception of the social world and the expression of their affective state enter into the new sign as the expression of their interest. The resources through which meaning is made are changed in this process of meaning-making, but so in the inner disposition of those who make that meaning inwardly in interpretation or outwardly in articulation. This process of inward meaning-making and the resultant change to the state of an inner semiotic resource is called learning (Kress, 2003).

Conversely, the process of outward meaning-making also has a transformative effect. Again, the sign maker's resources are changed because the sign made outwardly is a new sign which was made by the conjunction of an existing form with a new meaning. The transformations that are part of outward articulation produce new syntactic, textual and lexical forms which change the resources used in making meaning.

Methodology

This is a descriptive case study of four students from a class 34 students in the Civil Engineering Department. Prior to the selection of participants, a survey of the students was conducted by their first semester lecturer teaching the course English for Specific Purposes 1 (code A1003) and the students from this diploma class were found to possess an average proficiency level. Most of the students fell in the category of grade B-. They were also known to be noisy and active students during their first semester class.

The students were formed into groups of four. They formed self-chosen so that they could work efficiently. Prior to the selection of the participants, the researcher spent three weeks teaching the class three topics from the Module English For Specific Purposes A2003, Topics 1-3 which dealt with pronunciation, reading and writing industrial attachment letter skills. From observation, the students' competency was found to be average and they had difficulty in speaking and understanding long texts. After teaching the students and getting to know them, four subjects were identified for the study.

The student participants were chosen using a purposive sampling method whereby twenty-six students were purposively identified but only four participants were chosen based on their active participation. Four were selected because the nature of the data collection method limited the number of research participants who could be accommodated while ensuring that the "best" participants were included (Gay & Airasian, 2000, p. 138). The chosen subjects were two males and two females. All of them were 19 years old. Their pseudonyms were Siva, Hafizan, Anita and Fauziah. The respective student participants signed a consent letter.

The first subject, Siva, had a below-average English proficiency level and was observed to speak fairly well in English but was weak in writing. The second subject, Hafizan, was an average proficiency student and was able to give verbal responses accurately in his presentations. The third subject, Anita, was poor in making presentations in public and did not maintain eye contact with her audience. She did not like her course but due to family expectations she was forced to take the civil engineering course. She had a low proficiency level in English. Like Anita, the last subject, Fauziah was also weak in her speaking skills as she still could not express herself well in English. She was enthusiastic to improve her English because her ambition was to further her studies in Japan or Europe.

This qualitative study used semi-structured interview transcripts, documentation of events, samples of students' work, students' comments using a google forum, and written journals to collect data (Wilson, 1979, p.448 cited in Merriam, 1998). Data were triangulated on common themes at the end of the study.

The research design in this study had three phases. Purposive sampling and formation of groups were conducted in the initial stage of the study. In the second phase, seven lessons were taught using visuals and content in the Civil Engineering field. The seven lessons based on texts and images about Concrete Technology were arranged from simple to complex. The text used for the lessons was based on of the students' specialized content area. Different modes of graphics such as still drawings, flow charts, digital photographs and video clips were also used to enhance workplace literacy. In this phase, students were required to email their comments and responses for every lesson taught weekly. Finally, in the third phase, student participants were interviewed individually. The interview consisted of 13 semi-structured questions on students' perception about using visuals in the seven classes taught. The interview sessions were audio-taped and transcribed.

Summary of Findings

Mason (1996) in Potter (1996) translates information from participant observations into three types: literal, interpretive and reflexive. With respect to this study, Mason's technique of interpretive and reflexive analyses to analyse the findings is used. This was done by triangulation of the findings using triangulations from the students' google forum responses, individual interview transcripts, video recordings, field notes and individual work. It was found that each subject signified their meanings in different ways.

Learning as a Process of Sign Making

According to Kress et al. (2001), meaning making in reading and writing is seen as motivated activities and not as arbitrary, in which interest of the sign makers (in this case Siva and Hafizan) is expressed through their selection of apt and plausible signifiers for the expression of their meaning in a given context and in an always new sign. The students' signs are always transformations of the resources that were available to them, made in the light of their interest at the point of making the sign.

In line with Kress' hypotheses, it was found that Siva and Hafizan used signs or "pictures" to explain the process and procedures of Manufacturing Portland cement whereas Anita and Fauziah used simplified text to convey their meanings. In this lesson, students were given a text on manufacturing of Portland cement. They were asked to transfer the information into a flow diagram.

Iconic Signs

In the transfer of information from the written text on the production of Portland cement to a flow chart, Subject A, Siva used Pierce's "iconic signs" (Kress, 2003) such as small crosses to signify "limestone crushed to smaller fragments", a short

tube to signify a tube, arrows to signify “added on” and a cross-section view of a container to mean water and clay and an arrow pointing downwards and two containers like a pump to signify “pump to slurry tank”.

Here Siva felt that small crosses are “apt forms” because they show “limestone should be crushed to smaller parts”. This is clearly shown in the interview Excerpt 1 below:

Excerpt 1

- Interviewer : Why do you have this kind of cross in the first place?
Siva : In the paragraph there is a sentence which tells that we must “crush limestone to smaller fragments”. So I put this small cross because it shows me limestone should be crushed to a smaller part. That’s the reason.

The iconic sign of a tube is also used to mean “tube mill” and arrows are used as “added in” and to signify the motion of “rotating” and “pumped”. This is depicted in the interview Excerpt 2 below:

Excerpt 2

- Interviewer : In the second picture what does it symbolize?
Siva : It is a tube. There’s sentence telling that this crushed limestone is taken to a tube.
Interviewer : So it’s a tube? Then what happen?
Siva : **Then it mix with clay and addition of water. Then it is pump to a slurry tank and then rotating arms with compressed air through the bottom. The chemical will be added at the correct period at the tube and tank. Then the real slurry is stored in a final storage. The slurry is put on top of rotary kiln. Then this will be make moisture loss and become flakes. After that the flakes will move upper and lower of the kiln because it is rotating. There will be a chemical reaction also. The maximum temperature is 1500 degrees. After that there will be a lime, silica and aluminum recombined and added a bit of gypsum to prevent setting. At last this bulk will supply to other large places.**
Interviewer : So you represent it all with this kind of visuals. What does this arrow mean?
Siva : The arrow means **added in**.

In the excerpt, Siva was found to be able to relate and articulate the whole process of manufacturing (see Excerpt 2 in bold) based on only the signs that he had designed. It can be interpreted that the signs are meaningful conjunctions of signifiers to him. In addition, it can also mean that he could look at the signifiers and make hypotheses on what it might be signifying in any one instance because he knew that the form chosen was the most apt expression of that which was to be signified. In this process of inward meaning making in interpretation (from textual modes to iconic signs) and outward meaning-making in articulation, it is hoped that this learning process will enable the students of polytechnic to express their ideas and speak confidently in future at their workplace.

Using Signs to Make Meanings

Reading as interpretation is the making of new signs as signifiers of what one has received. It fills the signifier with meaning (Kress, 2003). In the work produced by Hafizan, it was found that he signified his interpretation of manufacturing of Portland Cement with signs of “small pebbles” for limestone, a “lorry” for a slurry tank, an “arrow” to signify the action of rotation, a “fireplace” for oven and a “silo” for a storage silo. This is shown in Excerpt 3:

Excerpt 3

- Interviewer : In lesson three, you were given a text to read and you were required to form a flow chart from the text. Now, why do you use this symbol to represent the text? Could you explain this to me?
- Hafizan : I draw this picture step by step. First I explain in the dry process and then wet process. I put **the small pebbles for lime stones and combine with water and clay**. The process will go to **slurry tank. (the lorry to represent slurry tank)** That's why I draw the **lorry** and this **arrow to state this is where the rotating begin**. Then the slurry is combined with required chemical compounds, the final process. And the put in oven. **The oven is hot, that's why I draw a fire place**. Then it moves to **storage silo. I draw this is look like a silo for me**. Then it's ready for use at the site.
- Interviewer : That's why you have **a lorry** at the last picture?
- Hafizan : **Yes, it means ready for use at work site.**

Here, unlike Siva, Hafizan filled the textual form of what he read with his meanings by using “iconic, indexical and symbolic signs” (Charles Sanders Peirce, in Kress,

2003, p.41) in which there is a relation of ‘consequence’, such as a “fire” to mean “oven” because it is hot and the “lorry” for “ready for use at work site”. Furthermore, similar to Siva, Hafizan also used “iconic signs” in which the form of the signs parallel the meaning of the signified – silo to mean “storage silo” and another lorry to mean “slurry tank”.

Hence the form as interpreted by him was a transformation of his meanings. The result of the transformation was available as new information or knowledge on his specialized field and was assimilated in its transformed shaped of “small pebbles”, “lorry” “arrow”, “fireplace” and “silo” into his existent knowledge about the manufacturing of cement. The assimilation or integration into his existent knowledge produced a rearrangement of all the elements read and amount to a transformation of all the elements and their interrelations. Getting meaning from reading was the effect of something like this, and meaning was “taken” at the moment when the “taken meaning” was integrated into the existing totality of all meanings in his brain. At this point, he knew the meaning of what he had read for himself and was able to describe the process in his email response.

Excerpt from email response by Hafizan:

To manufacture Portland cement, we need raw materials like calcareous materials and argillaceous materials. The basis material to make portland cement is limestone and clay. First we must grinding the combination of limestone and clay. Then we mixed and burned them in a kiln at temperature of 1300 to 1500`C. This proses will produce clinker which are cool and grounded to fine powder. At the same time, they add about 3 to 5% of gypsum. Finally, it will became a portland cement and ready to use at work sites.

The resource, which was a text on the wet and dry processes of manufacturing Portland cement, was also changed in the process of meaning making by Hafizan, inwardly in interpretation as shown in the above excerpt and outwardly in articulation. The process of inward meaning-making and the resultant change to the state of an inner semiotic resource is called learning. On the other hand, the process of outward meaning-making has a transformative effect because the signs made outwardly were new signs which were never made before by all the other subjects in this study and different from Hafizan’s signs. These inner transformation produced learning and learning was the subjectivity of the maker of signs as mentioned in Kress. The transformation that were part of outward articulation produced new syntactic, textual and lexical forms, which played their role, however slightly in changing the resource which was used in meaning-making. This is how semiotic change happens.

Using Boxes and Arrows

Anita and Fauziah, still could not interpret what was read in text form into iconic, indexical or symbolic icons. Anita felt that she had to put all the text details into the flow chart as she was scared that she might leave out some important points. However, she was able to signify the flow of the process by using square boxes to separate each stage of manufacturing Portland Cement.

Similarly, Fauziah also displayed her interpretation of the text by the use of boxes and two different types of arrows to represent the flow of the manufacturing process. Initially she intended to transf the meanings into the boxes, but as she proceeded with the other half of the visuals, she did not have the patience to complete the work. She also felt that the text given was difficult for her.

Here, factors of mode, affordances of the mode of writing and the mode of images has to be taken into considerations. The materiality and affordances of the mode of written text in Lesson Three has to be changed to a simplified text for weaker students.

Using the Elements from Videos to Construct Process

In the study, in the part based on interpreting the video clips of “Manufacturing of Piles” and in completing the Power Point project by Siva and Hafizan, it was found that the students interpreted the visuals by looking at the elements/signs such as “mould setting process”, “concrete bars”, “spun automatically”, “the half mould”, “computer”, “button heads”, “bitumen” etc (see Table 4) to construct the process. This method of interpreting the visuals was also found to be used by Fauziah and Anita in transforming video clips to their Power Point project.

Transformation is a resource for establishing links between categories, and for producing new resources out of existing resources. According to Kress (2003, p.47), transformation is treated as a process which works on a given structure and its elements, and it changes that structure and its elements in a specific, desirable way. In this study, it was found that the students were able to interpret the elements in the video clips, gestures and writing and represented them in a different mode, that is, multimedia, in the form of Power Point. This “transduction” (operation which involves shifts across modes) gave the students the opportunity to form a representation of two processes of their choice (either the manufacturing of piles or the process of pilling at a construction site) and presenting them verbally in their class or workplace. This may perhaps solve the problem of lecturers whose students have difficulty in discriminating what to choose from the Internet and just copy whatever they can access from the web page screen.

However, there was evidence of two elements which Siva and Hafizan misinterpreted from the video clips. They mistook the images of horizontally stacked piles with circular cut heads as “button head” in Step 9, and “autoclave curing process” as “steaming process” in Step 8 (see Table 1). These mistakes could reflect that the students were not reading the visuals based on their context but were identifying them as isolated elements from the clips to match their descriptions. Here, it can be inferred that the choice of visuals for teaching should be clear.

Table 1: Process - Manufacturing of Piles (from Hafizan’s and Siva’s project)

Steps/video clips	Representation of process	Elements and clues identified from video clips
1.	First, at the top of the manufacturing line is the cage making and mould setting process.	Scene of manufacturing and mould setting process
2.	The precast concrete bars are then stressed against the mould give a central shaft and stressing plate to ensure uniformity of stress in all the precast concrete bars and hence straightness of the piles	Image showing “concrete bars” and “stressed”
3.	The whole cage is then placed onto the bottom half mould.	half mould image
4.	Next, comes the concrete feeding which is carried out using high-tech computerized batching plant.	Computer image.
5.	The top half mould is then bolted to the bottom half.	Action of bolted
6.	Using the cage forming machine, the spiral reinforcement are formed.	cage forming machine spiral reinforcement
7.	The piles then undergo steam curing for early demould stacking in the stock yard. Demoulding is done with the use of a vacuum lifter.	vacuum lifter. Spinning/rolling
8.	The piles further undergo a state of the art autoclave curing process to achieve high straight concrete grade 80 and above. The piles can be installed immediately after autoclaving.	Image of “steaming process” misinterpreted as autoclave curing process installed immediately

9.	Here precast concrete are cut to correct lengths and the ends are warm headed to make button heads.	Button heads (misinterpreted wrongly with a stack of piles which resembles circular buttons)
10.	Industrial concrete piles has a bitumen coating facility requirements for project at certain sites.	bitumen coating
11.	Short piles can be handle easily by lifting at both ends while longer piles are lifted by wrapping wire rope at specific lifting points clearly marked on the piles.	lifting
12.	The finished piles are land transported by trailers or shipped by vessels or barges.	transported by trailers or shipped

Significance of Using Visuals

On the use of visuals to promote workplace literacy, the findings revealed that the students experienced a new way of learning English through the use of visuals with the computer. The visuals could arouse their interest in learning. For example:

“It is better we using pictures and visuals than words because when we see picture, ... make us to be more interest and we will think what is this picture about and when we will go through the pictures. And if it is only words, we will read and then we will forget. And I think picture is better...”

(Siva)

“... I think it gives me more interest in English and it make me more easy to understand what the lesson is about and it's not bore.”

(Anita)

“...I feel it is interesting...”

(Fauziah)

On the other hand, one participant felt that the visuals used should be integrated with text to promote better understanding and interpretation:

“Honestly my opinion, the technique that you gave to me to learn English for this semester, I see this we should do pictures and visuals together with the text”

(Hafizan)

Lacy (cited in Rezabeck, 2005) believes that visuals could encourage thinking skills and students could become more critical. Aligned to this belief, it was found that the participants perceived that using visuals is better than text to encourage their thinking skills:

“It is better we using pictures and visuals than words because when we see picture, it will make us to be more interest and we will think what is this picture about and when we will go through the pictures. And if it is only words, we will read and then we will forgot. And I think picture is better and I think the way madam teach us is the better way than just refer in the books”

(Fauziah)

*“....I learned many things, you teach **thinking skills**...”*

(Fauziah)

*“ ... about the last week lesson which is the activity about slump test, i think its quite so complicated and difficult to understand. at first, i still don't get the real meaning of slump test but after the second activity, i try to understand more after you give an explanation...both activities **allowed me thinking** and cooperated with my friends.”*

(Fauziah)

Besides enhancing thinking and memory, the use of visuals enhances the use of new vocabulary for their workplace. Chun and Plass (1996) state that the learning of dynamic graphic elements such as graphic organizers enhances the learning of new vocabulary. From the observation of the lessons, the participants were found to have difficulties in understanding the meanings of some vocabulary items for their workplace such as “calcareous” “argillaceous”, “shale”, “kiln”, “clinker”, “limestone” and verbs like “grinding, mixing and burning” in a text given. From the analysis of the interview, Fauziah she felt that the pedagogical approach of integrating the visuals and the content of her specialized field subject matter could make her become aware of many terminologies that she had not learned or known earlier. It also made her aware that she could use the words learned to describe processes in her workplace in future.

“.... Ah, a lot of words which were given, I realised, oh in my course there are these words which are different in diploma engineering, there is “the piling process”... These words are not used commonly and now I am aware of the existence of these words after this course. Who knows, one day when I become an engineer, these words will be useful for me. If anyone were to mention these words, I will know then

(Fauziah)

Conclusion

To conclude, the case study showed that using visuals to promote workplace literacy among polytechnic students has favourable responses from the participants. They claimed that using visuals is more enjoyable and they could apply the content of what they learned on processes and procedures to their workplace in future. Furthermore, this new approach enabled them to engage in new experiences of learning, and the meaning making experience through visuals enabled them to represent their visuals in the most apt and plausible way at the point of making new signs. The use of video clips to accomplish the workplace task with Power Point presentations provided the participants with the experience of discussing and working as a team which enhances their 21st century workplace skills. In addition, this approach also provided them with the skill of communication and the opportunity to express their ideas orally concerning their field content which indirectly built up their confidence in public speaking. In this study too, it was found that careful consideration should be given to the selection of visuals for teaching. Students have the tendency to misinterpret visuals presented in isolation and not based on the context as a whole. Hence, this study proposes a revision of the visuals used in lessons so that the effectiveness of the use of visuals is enhanced. On the whole, most of the participants agreed that the use of visual to promote their workplace literacy is a good strategy to improve their English proficiency.

Pedagogical Implications

This case study aimed at investigating how polytechnic students utilize and make meanings from visual inputs to explain their workplace tasks, and their perceptions towards the use of visual images to promote their workplace literacy skills. Students' perceptions were gauged on how they make meanings from the visual inputs to communicate and explain their workplace task.

The findings of the study seem to indicate that polytechnic students perceive that the use of visuals is a good strategy in enhancing their workplace literacy. Hence, students need to be exposed to more visuals, and use effective visuals to develop their cognitive and thinking ability. Practice with various forms of visuals will aid comprehension and encourage communication of meaning with visuals. In practicing with visuals, students will also be able to demonstrate how far they have understood the meanings of what they read in their engagement with text and visuals as well as express their thoughts and ideas in their future workplace.

Another implication from this study is that teachers should help students read and interpret graphic displays as changes are rampant in the new media age. How can teachers help students to read and understand graphic displays? First, when graphic displays and text appear in any media, teachers should draw students' attention to

the display and lead a discussion on what information is found in the visual display, and how it relates to the information in the text. Students may focus initially on literacy responses; however, the teacher could encourage higher level inferences and connections between the text and graphics. Secondly, teachers should help students to integrate and synthesize new information. Here the teacher could present various examples of graphic information related to but not included in the text. Some may be consistent with information in the text while others may be purposefully inconsistent. Students should be instructed to determine whether the information is believable or unbelievable based on information in the text or from their previous knowledge. Here students learn to synthesize information learned in the text and use it to evaluate typical graphic aids. Lastly, teachers should help students reinforce and apply graphic information. Students could create their own graphics and they may have to defend their choice of the most relevant, important, or key graphic aids in the text. They could be asked to elaborate on the relationships between two or more visuals, critique the use of other visuals, suggest additional visuals, or determine which visuals may be redundant or confusing.

Limitations of the Study and Future Research

A limitation of this study is that the results of the test for the group of participants selected in this study do not represent the whole population. This study is limited to only one particular group comprising 4 students from a polytechnic in Perak. The computer facilities available for the study also posed a constraint to implementing the lessons because students did not have the opportunity to do hands-on work with computers. They only had access to the computer at cyber cafés, and the computers at the polytechnic computer centre were corrupted with all kinds of viruses. In addition, the lack of Internet access also posed problems for the students to email their responses and give feedback to the lecturer.

Besides that, this study was limited to classroom-based observation where only the Civil Engineering Diploma students were observed. As such, it is not appropriate to apply the findings to other English language classrooms in other departments. The lessons created may prompt curriculum designers to look into new innovations in teaching in polytechnic colleges. Furthermore, the choice of participants for this study was based on the mixed ability of two average and two low proficiency students, and the results may not be applicable to other proficiency groups. In spite of such limitations, certain observations and recommendations could be made to improve future studies. With reference to this study, it is recommended that future studies should look into the use of visuals in other departments such as Mechanical Engineering, Electrical Engineering and the Commerce to cater to all the specialized fields of students. In this respect, the selection of visuals has to be based on the

respective field content. Care should also be taken in selecting the modes of visuals as some visuals might not be appropriate for certain disciplines. Finally, it can be concluded that the use of visuals corresponding to field content does promote workplace literacy.

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