The Design of Visual Materials for Academic Purposes:
The Case of a Mexican Postgraduate Student
at an English-Speaking University

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In this article I discuss how a Mexican master's student at an English-speaking university engaged in the design of tables, graphs and diagrams, and why he incorporated them into his written academic work. His previous and new experiences, the values of his discipline, the utilization of software programs, among other factors, contributed to his use of different types of visuals. The issues addressed here are important for writing teachers and their students.

En este artículo se discute el diseño de tablas, gráficas y diagramas para trabajos académicos de un estudiante mexicano de maestría en una universidad angloparlante. Sus preferencias, experiencias previas y nuevas, los valores de la disciplina, la utilización de programas de computadora, entre otros factores, contribuyeron al empleo de diferentes tipos de visuales. Los aspectos tratados aquí son importantes para maestros de redacción y sus alumnos.

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1. Introduction

The practice of visual design has played a very important role in academic and scientific communities. Larkin and Simon (1987) have discussed the effectiveness of diagrams, which helps to provide information more succinctly. They claim that the perception of quantitative data is improved when shown through a diagram. Visuals are also employed to facilitate the reader's understanding of the content in them (Swales, 1990; Berkenkotter & Huckin, 1995). Berkenkotter and Huckin (1995) affirm that readers of journal articles look for visual supports after reading the title and abstract, indicating their preference for these materials. King (1994) stresses the relevance of the utilization of visual representations in lectures. Subject teachers believe that their students will grasp the content more easily by showing overheads and slides. Certainly, the incorporation of visuals in lectures and writing is a well-known practice for academic and scientific purposes.

However, little attention has been paid to the teaching and research of visuals in English as a foreign language and English as a second language (EFL/ESL) academic writing. According to Johns (1998), the importance of visuals in this area has not been fully treated in the literature of the field. She argues that researchers have focused on the written text only, leaving out the importance and usefulness of visuals in academic texts. Teachers and researchers have overlooked how these materials contribute to the fulfillment of the students' written work. It seems that it is not common among composition teachers to show college students the usefulness of visuals in writing in spite of the fact that visual aids are central in lectures and in composition textbooks (King, 1994; Camps 1995). Johns (1998) suggests that the use of visual design in English for academic purposes (EAP) should be considered an important aid, and students should be encouraged to use it.

Visuals can be useful for students when writing for academic purposes. While conducting research on Mexican students writing at British universities, Camps (2000) observed that most of the participants designed visuals for almost all of their work which proved to be useful in responding to academic demands. If, for instance, the subjects were asked to present a discipline-specific theory, a diagram summarizing key theoretical aspects helped to demonstrate their understanding by explaining what was included in the particular visual with more written text. The reasons for the employment of visuals were diverse, he students incorporated them into their academic work based on what they learned from previous experiences, personal preferences, and the shared values of the disciplines, as seen in the field's literature. The participants made decisions on the type of visuals needed, and gave form (shapes, colors, words) and meaning to these supports.

The purposes and advantages that visuals have for these Mexican postgraduate students are worth looking at: how they enhance the students' work, what contributes to the engagement of these visuals, and how the students use them. In this way, by concentrating on one of these participants, I will address these issues so that teachers of

writing can reflect on the incorporation of instruction/lessons or the creation of visuals for written assignments. We will find semiotic differences (e.g., color, perspective, form, and composition) between each of the visuals discussed here, and we will see how meaning is represented and shaped (Kress & Leeuwen, 1996).[1] Through one case study, we will explore in more detail the kind of visuals the student produced. The focus will be on the different variety of visuals incorporated in his assignment and dissertation, and the personal and social aspects that prompted the way he engaged in their design.

I have divided this paper into three sections. The first section provides an overview of the student who participated in the study, and describes the research methods and data analysis. The second section examines the samples of visuals chosen to be included in this paper, and discusses their contribution to the participant's writing, and the elements that determined the design of his visual supports. Finally, various practical applications for the teaching of writing are discussed.

2. Overview of the Participant

Germán completed a Master's of Science in Information Management at Lancaster University. The program consisted of the development of theoretical and practical knowledge in order to handle the management of information technology. During his studies, he had to take several courses for a period of six months, work as an intern in a company for 20 weeks, give a presentation on a project, and finally write a master's dissertation. To enter the program he had to have a 6.5 on the IELTS (International English Language Testing System), which he had taken several times with little success prior to enrolling in the university. The last time he took the exam he obtained the overall band of 6.0, with a band of 5.0 on the written part. Consequently, the university requested that he take a two-month preparation course focused on academic writing.

Germán had ample practical knowledge from his work prior to his postgraduate studies. After his undergraduate studies in systems engineering, he worked as a manager in the quality control and production areas for a company in Mexico that produces leather for car parts, such as seat covers. In the work place, he engaged in writing for business purposes. This consisted of writing reports and proposals for projects on quality control and production. These texts documented and described the problems found in the department, the actions taken and the results of these actions. As will be discussed in the following sections, this experience contributed to the engagement of visuals for Germán's postgraduate written work.

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[1]   Kress and other authors (2001), and Kress and Van Leeuwen (1996) provide a thorough discussion of the semiotic use of images, pictures and other visual materials.

3. Research Questions and Methodology for Collecting Data

The samples of visual aids discussed in this article are taken from the data collected as part of a lengthier study that focused on the different writing practices[2] that six Mexican students engaged in for their written work (Camps, 2000). The following research questions were designed:

RQ1: What writing practices help the students to write their assignments/dissertations in English?

RQ2: Where/how were these existing practices acquired?

RQ3: What new practices did the students acquire in Britain that helped them with writing assignments and dissertations?

RQ4: What academic demands were the students dealing with?

RQ5: How did the writing practices assist the students in meeting these demands?

For the in-depth study, the data was collected mainly from four to five informal interview sessions in Spanish,[3] the students' written texts and the student handbooks. The informal interview sessions consisted mainly of open-ended questions[4] (Bogdan & Taylor, 1975). In general, the questions sought to obtain personal information (e.g., about the participants' undergraduate studies in Mexico, courses studied at the university in Britain, placement exam scoring, reading practices in English; writing practices in both Spanish and English during their undergraduate and postgraduate studies and careers, schools where they learned English), and more specific data (e.g., the demands the students faced, the feedback they received, the content of their assignments and dissertations, and any aspect related to their written work). The samples of students' writing were used to learn about the different practices they had engaged in to produce their work, and the writing processes they underwent. Their handbooks were useful in illustrating the demands, tasks, and conventions established by their teacher, department, or institute for the work to be done; the criteria for assessing the assignments, and the description of each of the courses the students took.

3.1 Analysis of the Data

The analysis drawn from the interviews and written texts to find out more about visuals was as follows:

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[2] Practices are "the general cultural ways of utilizing literacy which people draw upon in a literacy event" (Barton 1994:37). See Clark and Ivani (1997), Baynham (1995) and Camps (2000) for more on writing practices.

[3] The portions of the interviews included in this article have been translated into English.

[4] The questions used for the interviews do not appear in this article due to space restrictions. However, they are available upon request by contacting the author.

a) Selection of the student's responses related to the engagement of visuals in relation to the fulfillment of the academic demands and tasks in his written work, the assistance of these aids, his preference for using them, and the origins of their utilization.
b) Selection of the student's visuals in his texts in relation to the fulfillment of tasks and demands, purpose and assistance in his written work.
c) Selection of parts from the student's handbook in relation to demands and tasks and the utilization of visuals in the discipline for his written work.
d) Categorization of the interview responses, portions of the student' s texts and visuals in relation to purpose, source, and achievement.

The focus of the analysis of the student's interview responses about the engagement of visuals consisted of how the visual supports helped him meet the demands of his assignment and dissertation, and whether the student's previous knowledge and experience, the discipline specific literature, and computer software, had a part in the application of these visual supports. In addition, the analysis of the participant's written assignment and dissertation consisted of finding and selecting the most relevant visuals, and looking for written parts where these visuals were discussed. Finally, the analysis of the student's handbook focused on the tasks and demands for written work.

4. Germán's Visual Materials for his Academic Work

In the following section different types of visuals that Germán included in his assignment and dissertation are introduced. Table 1 provides an overview of these materials.

4.1 Samples of Germán's Visuals in his Assignment

Germán was asked to write a research proposal in Information Management for the Issues and Developments in Information Science course. He was required to explore a problem in a company, handle theoretical concepts and relate them to a problematic situation, explain what he was going to research and how he was going to conduct it. He also had to demonstrate his knowledge in the area; moreover, the arguments presented in his proposal had to be convincing.

Germán decided to write about the company for which he works in Mexico. He wanted to focus on a problem that his company had in the production of leather for car parts, such as seat covers. His knowledge and work experience as a manager in the area of production allowed him to show his expertise in dealing with this problem, and gave him sufficient information about the background of the company, the description of a specific situation, and the reasons for writing about his company. In this assignment, Germán incorporated different tables, diagrams, and graphs-some made by him, and others taken from different sources. His reasons for the selection and design of each of the visuals depended on what he wanted to demonstrate and explain in the different parts of the proposal.

Table 1. Overview of Germán's Visuals

Visual	In the text	Purpose	Source	Achievement
Figure 1	Background section in proposal	Display of theory	Readings	Discussion of theory
Figure 2	Same as above	Description of the company's growth	Previous knowledge	Description of the company's background
Figure 3	Context section in proposal	Description of companies	Previous knowledge	Justification for research
Figure 4	Methodology section in proposal	Display of research methodology techniques	Readings	Description of techniques
Figure 5	Same as above	Description of steps	Readings and Figure 2	Discussion of steps
Figure 6	First part of the dissertation	Display of project stages and general picture of the process	Experience in the project	Discussion of stages
Figure 7	Second part of the dissertation	Display of the project's participation process	Experience in the project and academic demands	Discussion of the project's participation process

The first diagram (see Figure 1) Germán used is taken from one of the sources that he read[5] and found to be useful in the introduction. In this section, he reviews the literature, defines concepts, such as competitiveness and strategy, portfolio management, capital allocation, core competences, strategic planning and strategic thinking; he explains the theoretical aspects of competitiveness under a strategic framework. This part of the proposal was necessary, as concepts like strategy and competitiveness are key words in the assignment, and in the field of Information Management. He provides a brief description of general issues about strategy and explains the evolution of the concept of strategy in past decades. After defining and explaining the terminology, he proceeded to explain the analytical tools, in order to focus on the competitive environment around the organization that he would research. To display these different analytical tools, he found a useful diagram from one of the readings and incorporated it into his work.

According to Germán's proposal, the diagram represents five competitive forces:

Example 1 from Germán's assignment
Michael Porter developed a collection of analytical tools to examine the competitive environment around an organisation. This is embodied in its "five competitive forces" which "provides an understanding of what forces influence degrees of competition and opportunities for building competitive advantage" (Johnson and Scholes, 1997:108). The five forces analysed under this framework are the threat of entry, the bargaining power of suppliers

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5   Johnson, G. and Scholes, K. (1997:107).

and customers, the threat for substitutes, and the competitive rivalry within the industry (see Figure 1).

Figure 1. Porter's Five Competitive Force Analysis.

Figure 1.
Porter's five competitive forces analysis
Source: Johnson and Sccholes (1997, 107)
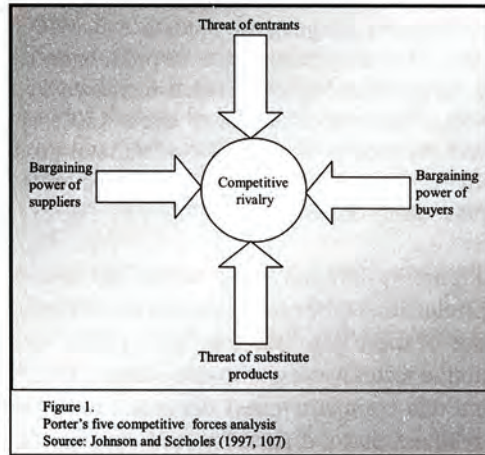
By showing the five forces in the diagram, Germán was able to demonstrate that he was familiar with the theoretical underpinnings, that he had understood the analytical tools used, and that he could relate the tools and terminology to his proposal. In this way, the visuals facilitated the reading and interpretation of the theory.

The second visual (see Figure 2) is also part of the introduction from Germán's assignment. He needed to provide an overview of the company he was writing about, including information such as location, type of production, market strategy, and growth. In this section of the company's background, he described its progress by illustrating the annual production development over the last three years.

Figure 2. Annual Production Growth.
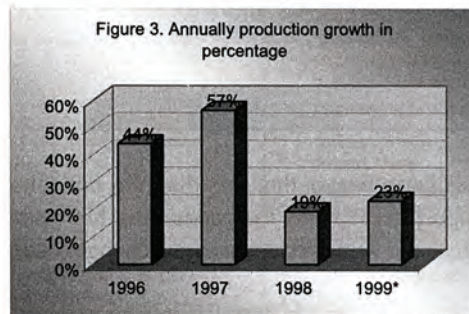
Germán's position in the company as a production manager facilitated the access to this information; consequently, he included it in his assignment in a graph. The percentages presented served to explain the description of the company's growth, which he referred to and discussed in prose in a paragraph.

> *Example* 2 *from German's assignment*
> In the last 3 years, CIB has grown 170% in production terms (see Table 1 and Figures 3 and 4). Its number of employees has increased from 450 in 1996 to 1120 at the end of 1998, which means a growth about 150% in labourer force terms. Direct and indirect exportation means 86% of its total production and more than the 85% is sold to OEM enterprises. The turnover expected for 1999 is approximately 50 million dollars.

The third visual (see Figure 3) is found in the second section of the proposal, where Germán discusses the production of the most representative companies in the automobile sector, and the influence of these companies on the value system. He first needed to describe how the automotive sector was a worldwide industrial leader which had influence on its value system, and that competitiveness depended on logistics, technology, and leather suppliers. He realized that a diagram would explain the relevance of leather production to the car industry and could demonstrate and justify that the leather production for car parts in his company would be a good area for research. For this reason, he designed Figure 3[6] by circling the area of research to be taken into account.
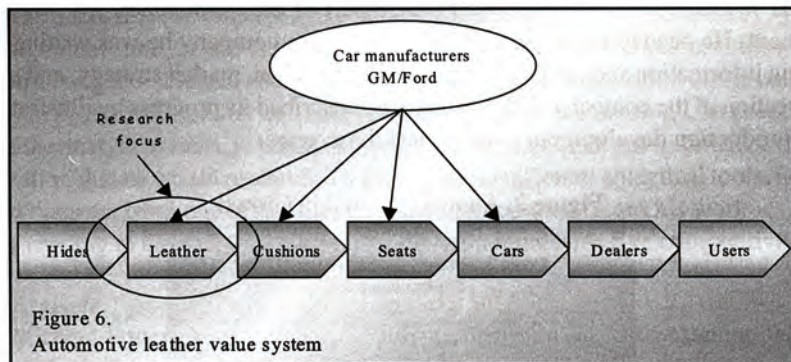
Figure 3. Automotive Leather Value System.

In his assignment, Germán indicates that this diagram condenses the information he needed in order to support his reasons for conducting his research. He describes the characteristics of this particular value system in which changes can occur in the automotive

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[6]   This visual was first published in Ivani and Camps (2001:22).

environment, such as unexpected increases or decreases in production rates, and influences on car producers. He justifies his main reason for undertaking this research as an opportunity to improve the competitiveness of his company, by taking into consideration the disparity in technology application that Mexican leather suppliers have.

> *Example 3 from Germán's assignment*
> Other characteristics of this particular value system are that companies which are farther from the automaker (left side in Figure 6) have less technology applied and are more influenced by changes in the automotive environment, such as unexpected increases or decreases in production rates. This is seen as an opportunity to improve the competitiveness of CIB taking into account that these gaps in technology application are stronger in Mexican companies, especially with hides suppliers.

Once Germán had described the company's background, and had justified the research, he was asked to explain how he was going to carry it out. Thus, he had a table (see Figure 4) to describe the steps to be taken as part of the research methodology based on what he calls "frameworks."

> *Example 4 from Germán's assignment*
> Four relevant frameworks have been identified of relevance to overcome the project. These frameworks have been embodied explicitly or implicitly in the methodology. Table 2 [Figure 4] describes them and includes their sources of information while the methodology is described in the next section...

Figure 4 shows the type of frameworks, their relevance and their sources:

Figure 4. German's Frameworks.

| Table 2. Frameworks		
Framework	Why it is important?	Sources to consult
1. Strategic management	Gives the background to analyse the competitive position of the organisation throughout specific tools and concepts.	Authors: • Porter, Michael 1. Brown, David 2. Hamel, Gary / Prahaland, C.K.
2. Automotive leather value chain	Helps in set a reference to compare actual situation and to identify opportunities areas.	• CIB knowledge. • CIATEC (Research and Technological Assistance Centre for the Leather and Shoes Industries). • British Leather Technology (BLT). • Sector publications.
3. Strategy for 1ST	Gives techniques for setting 1ST strategy and its implementation.	Authors: • Robson, Wendy • Brown, David • Rayport, Jeffrey • Davenport, Thomas • Gallierds. Robert
4.1ST in the automotive and leather sector	Helps in set a reference to compare actual situation and to identify opportunities areas.	• Internet • Sector publications • Experts

The information he had included in Figure 4 prompted Germán to have the steps for his research in Figure 5.

> *Example 5 from Germán's assignment*
> The action research requires a methodology, which is going to be tested throughout the process. Basically, the methodology used in this project is the model showed in the Figure 7, [Figure 5] which includes six main activities. The model itself is based on general practices from the frameworks mentioned above that have to be adapted to the specific circumstances around the project. Activities and its explanation are described in this section.

He then provided a detailed description of each of the six steps in six separate paragraphs. As a result of the table, he was able to have his explanation visually represented in the diagram and textually represented in several paragraphs.

Figure 5. Methodology.
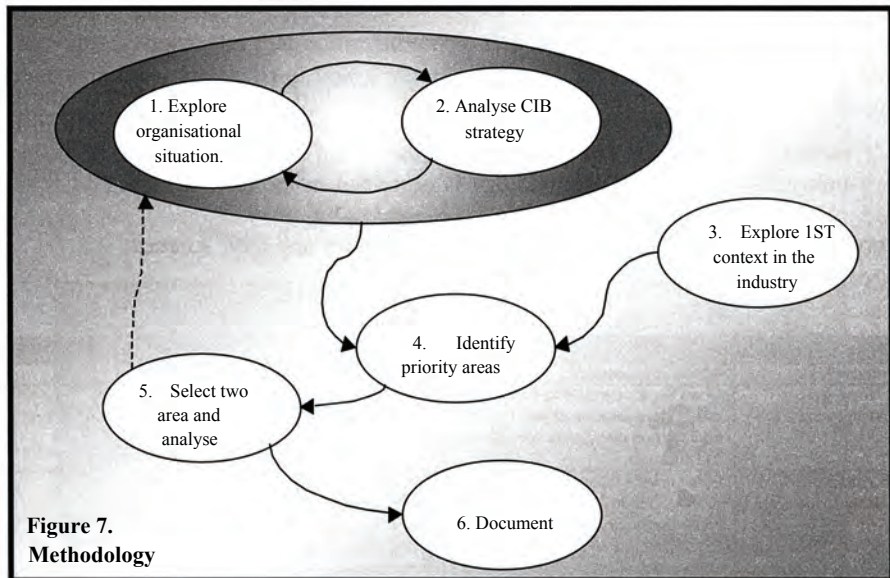
42 Samples of Germán's Visuals in his Dissertation

Germán wrote a 10,000-word dissertation on an organization-based project. He decided to work as an intern in Ford Motor Company, where he explored a problematic situation and proposed changes or solutions. He was required to divide the dissertation into two parts. The first part was a description of the company, its situation, the work conducted and its impact on the organization. He was expected to include clear accounts of his

experience related to information and systems ideas, and to discuss his experience in the application of specific theoretical Information Management concepts. In other words, he should apply to a real life-situation what he had learned in his postgraduate courses regarding information and systems theory. The second part was about the lessons learned from this experience related to the application of information and systems concepts. He also had to cite references properly throughout his work and compile a bibliography. He could incorporate diagrams into the body of the dissertation and additional supplementary material into appendices.

As part of working for the company, Germán had to provide an account of this experience in the first part of the dissertation. This account consisted of the stages of the project and was condensed in Figure 6.

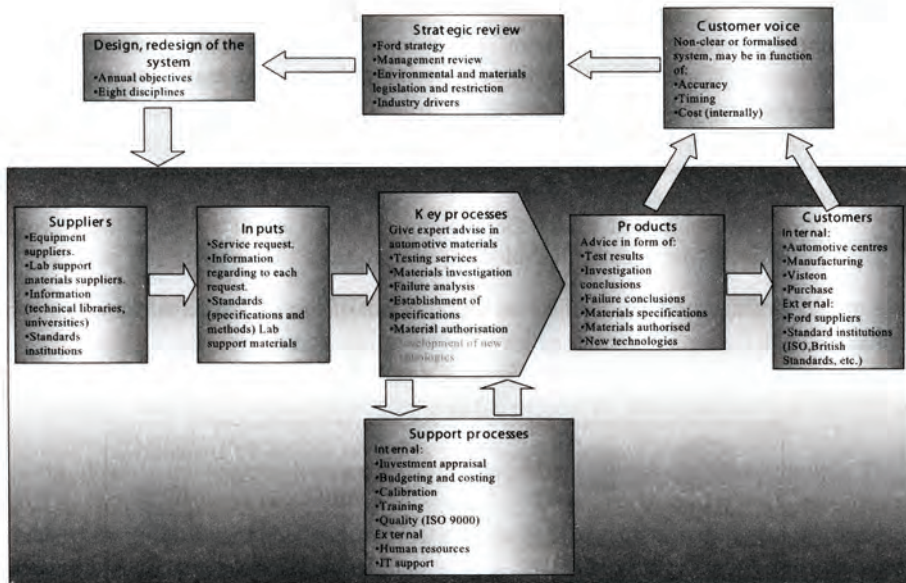Figure 6. Germán's Participation on the Project.

Figure 6 served several purposes. The first was to organize his thoughts and classify them by looking at the steps of the process before the actual writing of the first part of the dissertation. The second purpose was that the diagram helped Germán to have a general picture of the whole process. Thirdly, it helped him to draft the development of the process of the project as the diagram provided him with a clear picture of the most important events. Finally, the visual served to organize and draft the discussion related to the steps of the process.

Example 6 from the interviews with Germán
so to conceptualize and so on I used the diagram, the organization's diagram and as I advanced in the project, I made diagrams I felt I needed or that they could be useful, so this heavy work during the project saved me a lot of time at the end because it was a matter of "hey, look I've got it here, I change two-three things, make it look nicer or more awful and put it in the dissertation ..."

Germán also had another useful diagram (see Figure 7) in the second part of his dissertation to illustrate some of the most important moments while working at the project, and to help him understand what he had learned from this experience. In this part he had to discuss the impact that the project had on him, as he was asked by the academic department to provide a "rich picture" to analyze the "intervention" and the "administrative process" as he mentions in his written work:

Example 7 from Germán's dissertation
The rich picture in Figure 9 [Figure 7] gave me the opportunity to analyse the intervention more easily. As has been stated, the organisation needed improvements in its administrative processes. Therefore, the managerial team saw in a LIMS the magic solution for such problems and a team was integrated in each country to work in the selection of the package (LIMS team). Nevertheless, different factors made difficult the task of achieving a consensus in the characteristics that the LIMS should own. General operational differences between countries and areas of expertise, lack of information management background, lack of involvement of the IT Department and the lack of a well defined project were some of the factors that blocked the progress of the selection process.

As a result, Germán had Figure 7 to show the effect of these lessons and their impact:

Figure 7: Germán's rich Picture.
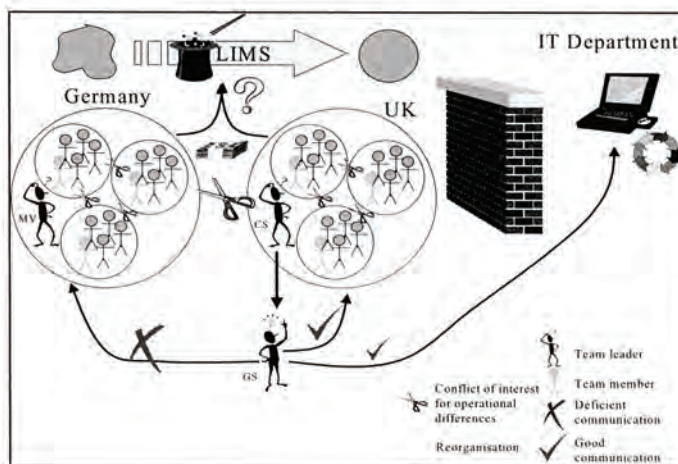
This diagram was useful for Germán to show not only what he had undergone in the experience of working on a project, but also to understand what he actually learned from it. Therefore, the prose discussion of the project would be conducted according to the order of these events, as displayed in the visual.

5. Discussion

The purposes and sources for designing visuals, as well as the way Germán relied heavily on them for his academic writing for the Master's program in Information Management, lead us to discuss the following points:

1. Socialization into the visual literacy of Information Management.
2. Personal reasons and experience for choosing visuals
3. The use of computer programs in the design of visuals.

5.1 Socialization into the Visual Literacy of Information Management

The academic work Germán was asked to carry out aimed to assess his ability to meet the requirements, to demonstrate his knowledge of the field and to conform to the shared practices of visualization. For instance, as a result of having the visuals, he was able to:

a. present theoretical aspects and apply them (Figure 1 and Example 1),
b. condense content-specific information (Figure 1 and Example 1, Figure 4 and Example 4),
c. describe the company's situation (Figure 2 and Example 2),
d. justify his reasons for choosing the focus of his research (Figure 3 and Example 3),
e. explain the methodology for possible research (Figure 5 and Example 5),
f. show the stages of his participation in the project for the dissertation (Figure 6 and Example 6),
g. discuss the lessons learned from this experience (Figure 7 and Example 7).

These points were part of the demands issued by the academic department and were expected to be covered in the assignment and dissertation. As Lea and Street (1998) indicate, college students are involved in a variety of activities or practices to help them deal with new challenges. In Germán's case, he had visuals to help him meet these new challenges, and to better conceptualize and display the information, with the aim of accomplishing the discipline-specific purposes discussed in the previous section (e.g., present theory, propose research, and describe the lessons learned).

The readings in the discipline played a role in the engagement of visuals for academic purposes. Berkenkotter and Huckin (1995) point out that visual supports are important for scientific journals where readers often look at them to facilitate their understanding of what they have read. In the case of Germán, he drew on visual support not only to

have a better understanding of the theory of strategic analysis, but also to demonstrate this understanding by applying it to his analysis (see Figure 1). For this reason, he decided to copy a diagram from a reading in the discipline that dealt with strategic concepts. He thought that it would be better to have a diagram with a model of the theory of strategic concepts from one of the readings than to have a diagram made by him. This would provide a more accurate description of the theory for demonstrating his understanding of concepts.

Another important factor in the engagement of visuals was the recommendation for their utilization by Germán's academic department. Usually, students from discipline-specific departments quickly learn about the shared values, norms, specialized terms, and common genres of their discipline; therefore, they are expected to consider these aspects when writing (Grabe and Kaplan, 1996). In the case of Germán, this was not the exception although he said that his academic department did not explicitly mention the utilization of visuals. The guidelines of Germán's department provided specific instructions regarding how visuals should be included, such as title, and number and type of visual (e.g., diagram, table or figure), implying that these supports are common, shared and valued practices in Information Management.

> Example 8 from Germán 's student book
> The author must provide as an integral part of the dissertation a list covering the entire contents, including preliminary matter, diagrams, illustrations ... figures should be numbered consecutively...should have a caption....

Moreover, the department strongly recommended having a visual or a "rich picture" (see Figure 7), in the dissertation where the students had to describe the process of their participation in the project in which they would engage. Germán followed the specifications for having this rich picture, meaning that the values of his discipline were considered important and that they did have a part in his utilization of visuals.

5.2 Personal Reasons and Experience for choosing Visuals

Germán strongly believed that visuals would help him avoid writing excessively in English. It would be much easier to have an image, as he called it, than to have many words and sentences that could increase the risk of having many grammatical mistakes. When we talked about his assignment, he had expressed his concern for writing incoherently in English, and mishandling sentences due to his limitations in the language. He believed that the incorporation of a diagram into his work would provide a better way of describing the information by condensing it into fewer words, consequently, reducing the possibility of language errors and miscommunication.

Example 9 from the interviews with Germán
I like the visual a lot, that is, it's easier for me to understand a table than to understand a text or to understand an image than to understand a text... I like to conceptualize a lot, see everything in a diagram or picture than seeing it in a text, especially with the language problems, with English, it's easier to show it, an image says more than thousand words...

Although Germán's intention for including visuals was to avoid making mistakes in English by having more images than words, we see that these visuals also caused him to have more discussion with written text. Two issues arise from this belief. On the one hand, the visuals were intended to assist him in explaining concepts or theoretical issues more succinctly. Larkin and Simon (1987) have discussed how the information can be represented more effectively with key words, values and numbers in a diagram than having written text. On the other hand, we also see that what he had presented visually, such as in Figure 6, made him write more as he narrated his dilemmas, successes, and rewarding experiences in the project. Thus, the diagram did not actually help him to write less in order to eliminate the possibility of grammatical errors; on the contrary, it caused him to have more written text, more errors, and the risk of more miscommunication.

Another reason for incorporating visuals into his academic work was Germán's preference for images. It is easier for him to portray his ideas in pictorial representations, as he believes that it facilitates the understanding of the content to be discussed in written text. In this respect, Richards and Lockhart (1994) emphasize the usefulness of different learning styles (i.e., auditory, visual, or kinesthetic) that students possess to help them with their development of "skills" for learning and practicing English. In Figure 3, Germán says that he can better analyze the tendencies of the company's growth, strengths, and development, and highlight the principal points through a diagram, rather than to put everything in prose without a diagram.

We can see that his preference for visuals makes Germán's work easier to carry out. As in John's (1998) exploratory study, where she discussed the participant's preference for visuals in order to facilitate her work of summarizing the information and understanding theoretical aspects, the case of Germán is similar. This tendency helps him to use a visual in order to have a clear view of all he has included, so he can better organize the points he wants to discuss and more reliably and solidly support his explanations. As a consequence, he is able to demonstrate that he organizes and handles the information well, in addition to applying and understanding the appropriate theory and concepts of his discipline.

Finally, Germán's previous knowledge also had a part in the development of visuals. He had been involved in visual design since his undergraduate studies and work. This practice had been useful in his essays, quality control reports and business proposals where he condensed the information he discussed in written text. Friedlander (1990) has explored how non native-writer students' previous knowledge can help their composition

in English. The students find it easier to write in English about topics they have learned in their native language. Certainly, this was also the case for Germán's academic writing. He drew on his previous knowledge of the company that he worked for in Mexico, and his experience as a manager, to help him present the company's background and discuss a researchable area. This information was not only helpful for him to have this description, but also to create visuals like Figures 2 and 3 where the company's progress and problem are shown. Hence, his practical and previous knowledge were important factors in the incorporation of information in the content of the visuals, and in the creation of the different types of visuals that he thought to be relevant to his postgraduate work.

5.3 The Use of Computer Programs in the Design of Visuals

Germán's design of visuals was computer mediated. In both his proposal and dissertation, he made use of software programs like Word, Excel and PowerPoint to create his diagrams, tables, and graphs. These technological tools allowed him to manipulate geometrical shapes, colors, and pictures, or to add information to display graphically, as shown in the company's tendencies and growth in Figure 2. These computer programs also facilitated the organization and aesthetic quality of the visual supports, as Germán could move them around the texts more easily, changing aspects in them like color or shape, and adding pictures with the purpose of having a refined and elaborate design. The use of software programs to change color and tone resulted in the use of additional information. For example, the color in the bars of Figure 2 has the purpose of contrasting the color used in the background.In this way, the reader can easily identify the bars without any confusion.[7] Finally, by manipulating the visuals through the use of these software programs, Germán could develop and organize his paragraphs based on what he had included in these visuals, thus being more productive in his writing.

The utilization of these tools made Germán's work easier in contrast to other, less sophisticated, technology available, like color pens and a ruler that would have made his work harder and more tedious. Indeed, at this turn of the millennium, computers and software programs have become a vital tool in the development and change of how we engage in writing for academic purposes. Clark and Ivani (1997) have discussed how computers affect different types of writing practices, such as drafting, revising, and editing. Any computer-bound writer can draft and correct almost simultaneously, something which was not possible 15 years ago. Similarly, the use of computers has changed the way writers engage in the design of their visuals.[8]

[7] See Kress and Van Leeuwen (1996), and Kress and Van Leeuwen (2002) for more on color affecting communication.
[8] See Myers (2000) on how software for visual design has influenced his written work.

6. Conclusion

Several elements are involved in the design of visuals in Germán's academic work. We cannot claim that the only factors influencing the implementation of visuals were the values and norms of the discipline or Germán's own previous knowledge and experience. Rather, besides these important influences, there are other personal and social ones involved, such as Germán's preference for pictorial representations, his concern for errors in his writing, his utilization of technology in the writing process, the publications in the discipline, the academic department's disposition for having visuals, and the fulfillment of the academic demands set by the university.

The utilization of visuals also contributed to the production of more written text. In a writing course, teachers can take into account that visuals can play an important role in the development of the students' writing. Depending on the type of content incorporated in a diagram or table, the students can have more written text. Teachers can create activities oriented to developing a visual where they include specific vocabulary, and then the students can be asked to write a paragraph related to the content found in the visual and present the activity to the class. In this way, the students will realize that visuals can actually help them develop their writing, and the entire class can participate in giving feedback to their peers and starting a discussion about the usefulness of visual material in their writing.

As we have seen, visual supports can facilitate the reading and understanding of information since they can contain a synthesis of the most relevant aspects from the discussion of a paper. Writers can select what they think is worth showing according to the expediency of a type of visual aid. Similarly, the focus on tables or diagrams in a writing course can be a good way to help students to learn how to select and summarize information that they may deem useful. The composition teacher can ask them to read a given text, select the main points and categorize them. Then, they can decide which related topics fall into the categories and design a table. Afterwards, in groups the students can share what they have done with the class and determine which visual material has the most condensed and significant information, and if it will provide a clear understanding of what they are discussing textually.

Hence, as composition teachers we should exploit the utilization of visuals in our courses by showing our students the different types of visuals available to them, and the ways that they can use them to supplement and support their academic writing. Class discussions on the usefulness of visuals can he a good way to reflect on how they can be constructed, and why they should be incorporated to the students' work. Students should be required to investigate how visuals are valued and used in their disciplines. Teachers should have them design different types of visuals (e.g., diagrams, figures, and graphs), so that their students can determine if these visuals really help them with the development of their writing, or if they truly contribute to the fulfillment of the academic demands set by their university's departments. In this way, they will realize the importance of visual supports and engage in their use when they deem necessary.

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