Acquiring, Elaborating and Expressing Knowledge: A Study with Portuguese University Students[1]

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Abstract

Academic success depends on students' knowledge and on their capacity to communicate it properly; writing skills are relevant in this process. Writing is also a learning tool, facilitating the way individuals apprehend and elaborate contents.

Many Portuguese university students have difficulties whenever they have to deal with writing tasks. Describing the processes students follow when they acquire, elaborate and express knowledge, and inferring how far writing is involved in such tasks, are the aims of this quantitative study. It is based on a questionnaire administered to a sample of about 1,700 students of different scientific areas.

Results presented in this paper show that Portuguese university students use writing mainly to take notes during classes and to express knowledge for evaluation; using writing to structure and elaborate knowledge is not frequent; some features of immature writing emerge from the students' answers about their performance in exams.

Introduction

There is some evidence that many Portuguese university students have problems whenever they have to deal with writing tasks, either tests and exams or essays and reports. As much as problems related to transcription and other surface textual aspects, difficulties concerning elaborating knowledge and conveying it in written language often arise.

Taking into account that many of these difficulties might be related to previous steps involving knowledge acquisition and elaboration, and considering that writing plays an important role in such processes, this study aims at answering the following questions:

– How do Portuguese students acquire, elaborate and express knowledge?
– How far is writing involved in such tasks?

Writing and learning

Writing is language class content and also a learning tool, playing an important role in both knowledge acquisition and knowledge expression. In fact, writing seems to be relevant not only whenever students have to express the knowledge they have acquired, as it

happens in tests and exams, but also in other academic tasks involving knowledge construction.

Success at school may therefore depend on writing abilities. On one hand, that happens because writing fosters learning as it enables students to organise and structure knowledge acquired from different sources (oral and written). On the other hand, it is obvious that competent writers are able to express their knowledge better than developing writers do. Some students might fail not because they do not know the content that is being assessed, but just because they are unable to write about it properly.

The role of writing as a learning tool has been enhanced for the last decades. According to Emig (1977:122), writing is a «mode of learning». This learning is, nevertheless, more than simply acquiring and accumulating knowledge. It is, alternatively, a «process whereby meanings are taken in by a person and made sense of in relation to their present and previous experience, and through that process re-made by them.» (Jewitt, 2006:27). When we analyse the contribution of writing to learning we must immediately consider the important role writing might play in enhancing the development of more complex forms of thought. That happens not only because the explicitness and permanence of written language make reflection and revision easier, but also because the conventional forms of written discourse enable the expression of logic relationships between different ideas. When we write, we usually have to provide definitions, make assumptions and premises explicit, and observe the formal rules of logic. As far as it enables the transition from face-to-face communication to communication with a remote audience, written language can be seen as an instrument of considerable power for building an abstract and coherent theory of reality, and developing logical reasoning. (Olson, 1977; Applebee, 1984; Bereiter and Scardamalia, 1987).

Based on Rivard's theories, Hand and Prain (2002:739) refer to different «factors for writing to enhance learning: the demands placed on the learner by the writing task; the learner's metacognitive understanding of appropriate strategies to use; the contextual aspects including a classroom learning environment focused on deeper conceptual understandings rather than factual knowledge; a complementary match between genre or type of writing, conceptual structure of the topic, and broader curricular goals». According to the same authors, «writing tasks that require students to reflect upon their own alternate conceptions, engage current authorized conceptions, and consider real-world applications within a supportive classroom environment which tolerates multiple interpretations could enhance student learning and promote conceptual change».

As a learning tool, writing may be applied through the whole learning process, from early stages, in which a student acquires knowledge, to the last moments when knowledge is expressed in papers or exams. It may also be involved in intermediate stages, enabling students to structure and elaborate the knowledge previously acquired.

Writing and knowledge acquisition

Note taking can be associated with the first steps of a learning process. It facilitates knowledge retrieval from oral presentations or from written texts (books, articles or others). Good notes may somehow be related to better academic performances. That happens whenever the students develop personal ways of taking notes and do not limit themselves to transcribing what they hear or read. They should actively involve any previously acquired knowledge about the topic they share with the person they are listening to or the text they are reading. Notes are records of more or less explicit information collected from different sources and function as a kind of external memory to be remembered and used in future tasks such as planning or writing an essay. Taking notes, implying comprehension and writing, is not an easy task to perform and students often have difficulties when they have to do it, because notes are taken while they simultaneously perform another task like listening, reading or observing. Note taking is a highly demanding task insofar as multiple cognitive processes must be coordinated in rapid succession. Note takers have to deal with problems related to the flow of information, the working memory that enables storage and manipulation of information, and the activation of other processes specifically related to comprehension and to writing. When listening, the note taker is constrained by the rate of speech of the lecturer; when reading, the constraint exists because transcription is slower than reading. (Piolat, Olive and Kellog, 2005).

Writing and knowledge elaboration

As a learning tool, writing may be particularly important during those intermediate stages in which students have to put together and organise information emerging

from different sources, producing syntheses, maps of concepts, diagrams or other written products. In fact, the effective contribution of writing to learning depends a lot on how students are able to transform knowledge by the use of writing.

Discussing how writing fosters learning, Hand and Prain (2002:740), refer that «student writing promotes learning spontaneously by shaping thought at the point of formulation, in that the expression of ideas makes understanding more explicit.» They also say that «writers transform their ideas by ongoing analyses of their texts in terms of expanding inferences, reviewing idea development, noting contradictions, and making appropriate revisions.»

According to Tynjala, Mason and Lonka (2001), writing may be a useful and effective learning tool whenever it is used to promote active knowledge construction leading students to engage in knowledge transforming processes rather than in reproductive activities. Using their previous knowledge, students should reflect upon their own experiences and conceptualise and theorise on them.

Following Armbruster, Mc Carthey and Cummins (2005:71), we can say that «students can use writing as a tool to develop concepts and generalizations, promote critical thinking and problem solving, analyse and reflect on their thinking and understanding, gain new insights, and contribute to learning and remembering content information».

Writing and knowledge expression

Writing is equally important whenever students have to express knowledge acquired within a course or a subject in a certain academic context. In such contexts, writing is used for several purposes; it is involved in the production of different kinds of texts: reports, literature reviews, essays, written answers in exams. Besides generic abilities, writing in academic environments requires specific capacities in order to fulfil the demands of communicative contexts often involving conventions that have to be followed according to the specific genre involved. Linking form and function, genres, are, according to Klein (quoted by Hand and Prain, 2002:740), frameworks for learning as far as «knowledge of the micro and macro structure of texts, as well as the purposes of these structures, enables students to identify relationships between ideas, and hence clarify understanding of content». Besides this,

students also learn by writing, as they have to set and address rhetorical and content goals.

Academic success is highly dependent on writing abilities. These are extremely relevant when students have to write down their answers in tests or exams in order to demonstrate knowledge acquired in a course. The writing process usually followed by proficient writers is success enhancing as far as knowledge is *transformed* and content adapted to a communicative context and an intended reader within a complex, goal-directed, problem-solving activity. On the other hand, the *knowledge telling* process, usually followed by poor writers, tends to be less effective, consisting on a content retrieval based on cues, without any transformation in order to fulfil communicative goals. Composing is just generating appropriate content items and writing them down (Bereiter and Scardamalia, 1987).

Portuguese university students writing performances

In Portuguese universities, many students seem to underperform because they lack the writing skills involved in knowledge acquisition, knowledge elaboration and knowledge expression tasks. Qualitative studies aiming at describing how they take notes, organise information and write essays (Carvalho and Pimenta, 2007; Carvalho, Silva and Pimenta, 2007) demonstrate that students have difficulties in dealing with information taken out from oral presentations or texts. This may, somehow, affect their academic success. Most students involved in these studies were unable to organize data in a personal way and to transform information into knowledge. Most of their problems might be related to a lack of skill in selecting, organizing and transforming information. These studies also demonstrated that students had difficulties when performing writing tasks. Such difficulties concerned the whole process of essay construction, being related to the way they read their sources, register and organise information, relate knowledge acquired from different sources, and fulfil academic writing conventions, often ignored or misused. It was also obvious that students often simplify the process when they are writing their academic essays by getting information from the sources and writing it down immediately in their own papers without any kind of elaboration.

The study

In order to describe the processes followed by Portuguese university students when acquiring, elaborating and expressing knowledge and to infer how far writing is involved in such tasks, a quantitative study, based on a questionnaire administered to a sample of about 1,700 students from different scientific areas, was developed.

Questions focused on the following:
1. note taking processes during classes;
2. written sources used for studying;
3. processes used to emphasise relevant information while reading (underlining, taking notes on the text margins, writing reading notes…) and to organise and elaborate acquired knowledge relating information retrieved from different sources;
4. studying habits;
5. writing processes followed in knowledge expression tasks, especially in evaluation contexts (how information is retrieved from memory, how it is structured, organised and written down).

Most questions had a Likert-scale format. Students had to chose from 1 to 4 (1 never; 2 sometimes; 3 often; 4 always), considering the frequency each situation stated applied to their own cases.

Results

In this section we present the results concerning the different aspects focused on in the questionnaire.

1   Note taking processes during classes

Asked to characterise their notes, a great majority of the students say that their notes are often or always the transcription of what is relevant in the teacher's discourse (Education and Psychology – 90%; Medicine – 87%; Economy – 85%; Social Sciences – 84%; Child Studies – 84%; Architecture – 83%; Law – 82%; Humanities – 81%; Engineering – 77%; Sciences –70%).

Combining these results with others, we can see that what students consider relevant is variable and that note taking tasks are differently performed according to the subject area of the students. Humanities students (64%) usually reproduce as faithfully as possible everything teachers say, while Sciences (53%) and Engineering (51%) students tend to say they just register what the teacher advises them to write or what

is projected or written on the board. The integration of personal comments is only referred to as frequent by Medicine (54%) and Engineering (51%) students. Medicine (71%), Engineering (56%) and Social Sciences (56%) students say they frequently use diagrams and schemes. On the other hand, Sciences (55%), Humanities (55%) Child Studies (54%) and Education and Psychology (52%) students say they rarely do it. Students were also questioned about what affects the note-taking process during the classes.

The way the teacher organises his/her discourse seems to be the most important factor, referred to by more than 80% of the students. All the other factors mentioned in the question (the teacher's diction / the way he or she organises the discourse / the kind of lesson / teacher-student interaction / the use of the board or the projector / the conditions of the classroom / the size of the class / the schedule / the way students are assessed / noise) are considered relevant by more than 50% of the students, whatever scientific area they belong to.

2   Written sources used for studying

Analysing the question about the way students get to know the texts they should read within a course, we may conclude that the course bibliography, provided by the professor, is the main source of information for students. Engineering and Architecture students are the exception (around 50% of the students say they rarely use it).

On the other hand, only Humanities students (60%) refer to doing their own bibliographical search frequently. The majority of students of all the other domains say they rarely do it. (Economy – 75%; Medicine – 73%; Engineering – 69%; Sciences – 64%; Social Sciences – 60%; Education and Psychology – 60%; Architecture – 53%; Child Studies – 53%). Using texts suggested by other students seems to be frequent (except for Law, Humanities and Social Sciences students).

Asking students about what written materials are used for studying, we find out that the notes taken during the lessons, the documents provided by teachers and the photocopies of texts bought at the copying services of the University are the most frequently read kinds of texts. Only Medicine (70%) and Law (65%) students say they often buy books. Borrowing books from the library seems rather rare. Engineering students (64%) say they often download texts.

3 Processes used to emphasise relevant information while reading (underlining, taking notes on the text margins, writing reading notes...) and to organise and elaborate acquired knowledge relating information retrieved from different sources

One of the questions focused on the way students work with notes previously taken during the lessons. Reading, underlining and taking notes on the margins are identified as the most frequent practices. (Child Studies – 85%; Education and Psychology – 80%; Humanities – 73%; Law – 73%; Social Sciences – 72%; Economy – 69 %, Architecture – 64%; Sciences –63%; Medicine – 61%; Engineering – 54%).

Rewriting or composing new texts seems to be less frequent. Those students who admit doing that say that they synthesise using schemes and diagrams, or transcribe the most relevant parts. Underlining using a pencil or coloured pens seems to be the most common practice aiming at emphasising and registering relevant aspects, especially when students are reading photocopies of texts. Taking notes on the margins is not said to be frequent. Elaborating reading notes is not frequent, occurring mainly when the reading materials are original books or journals borrowed from the library. These reading notes are said to have different formats: Medicine students (89%) tend to elaborate diagrams; Law students (72%) prefer to transcribe the most important paragraphs; Humanities (73%) and Education and Psychology (72%) students often write a text synthesising what they have read.

4 Studying habits

One of the questions addressed what students do for studying during the school year, outside the period of exams. Answers reveal that reading the notes taken during previous classes, doing assigned homework and writing essays or lab reports are the most frequent tasks. Only Medicine (78%) and Law (55%) students report reading texts included in the course bibliography as a frequent practice.

Students say that they mainly study at night or in the afternoon, alone and at home. When asked how frequently they go to the library, most students say they do not do it very often.

As far as preparation for exams is concerned, reading class notes and other texts seems to be the most frequently performed task. Writing texts based on information retrieved from different sources is said to be frequent by Humanities (64%), Education and Psychology (62%) and Social Sciences (58%) students. Elaborating schemes and diagrams relating different aspects of the course content is relevant in the areas of Education and Psychology (65%) and Medicine (50%). Solving problems is frequent in Engineering (92%), Economics (87%) and Sciences (86%) students.

5 Writing processes followed in knowledge expression tasks, especially in evaluation contexts

There was a last group of questions, focusing on writing processes, more concretely on how students write their answers in exams. The analysis of the answers enables the following conclusions. The majority of students (above 80%) say that they usually analyse the questions of the exam before they start writing, trying to identify the aspects they involve. Rates for Sciences and Engineering students are a bit lower (around 70%). Most students say that they do not usually start writing as soon as they find the first suitable idea. Only Medicine (58%) and Engineering (53%) students admit doing it frequently. The use of a draft sheet to register the main topics of the answer is said to be frequent by more than 50% of the students. Medicine students are the exception (only 29% admit doing it frequently). Writing the answer in a draft sheet and re-writing it later does not seem a frequent practice. The use of a draft sheet to elaborate a scheme/diagram integrating the main aspects involved in the question is said to be frequent by Child Studies (71%), Humanities (61%), Education and Psychology (60%) and Social Sciences (59%) students, not by the students of other scientific areas. Most students (above 75%) say they try to include as much information as they can in their answers.

Considering factors like the teacher, the content and the course when performing a written task seems to be more relevant for Education and Psychology students (65%) than for the others. Medicine students are those who consider these factors less relevant. More than 50% of the students say that when they start writing, they go on without interruptions until the end. Science students seem to be the exception: 55% of them say they write step by step, interrupting the transcription process in order to think about what they are going to write afterwards. Most students (above 75%) say they are concerned with formal aspects of language during the writing process. More than 50% of the students

of the different scientific areas say that they usually evaluate what they are writing and eventually modify the text (content and form). Law students are the exception, as only 33% of them admit doing it often.

Conclusion

Considering the results displayed above, we may conclude that Portuguese university students use writing mainly to take notes during classes and to express knowledge in tests/exams, in essays or lab reports. Using writing to elaborate knowledge is not frequent. Studying is mainly based on reading tasks; writing to relate information, clarify ideas and enable reflection does not seem to be a frequent practice. As a matter of fact, when we consider the practices reported by the students, we can infer that writing seems to be more often used to acquire and reproduce knowledge than to elaborate and transform it.

Results concerning the way students write in tests or exams are somehow contradictory. On one hand, students report some writing practices that might be considered as characteristic of proficient writers (thinking before starting to write; considering the communicative context; revising and modifying the text). On the other hand, there are also some features of immature writing, (transcribing without pauses; including as much information as possible), emerging from the student's answers.

The results of this study demonstrate that Portuguese university students do not often use writing as a learning tool, which may be one of the reasons why they feel difficulties when they have to deal with written assignments. Something needs to be done as many students do need training on writing and on the use of writing to learn. Introductory courses on academic writing in the first year of graduation programmes would be very helpful but those courses are very rare in Portuguese universities since writing skills are something students are expected to have previously acquired in basic and secondary school. Besides the introduction of Academic Writing as a compulsory course in the freshman curriculum, other strategies could be used in order to promote students' writing skills and therefore enhance academic success. Among them, more frequent assignments, by teachers, of tasks in which students are not just supposed to express knowledge, but have instead to elaborate and transform it, would be very interesting, insofar as it might force students to change their working habits.

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