



Web 2.0 tools and critical thinking skills: a study at the Eduardo Mondlane University

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Structure of the presentation

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Purpose statement

The present study seeks to understand whether the application of Web 2.0 tools can be a decisive feature in the development of critical thinking skills for the Master students of Education Science at the Eduardo Mondlane University in Mozambique

Rationale

- The ICT policy of the Eduardo Mondlane University emphasises that the use of ICT can play an important role in the improvement of teaching and learning, research and university management (UEM, 2006). In contrast to this policy interest, it can be said that there is no scientific research which explores the use of Web 2.0 tools for the promotion of critical thinking skills in the context of higher education in Mozambique.
- The main motivation to conduct this research was that while teaching Master students of Education Science I verified the lack of critical thinking skills by the students as a major drawback of this offer.

Critical research question

How can Web 2.0 tools, specifically blogs and wikis, be used to promote critical thinking skills in students of Master in Education Science of the Faculty of Education?

Conceptual framework

The pedagogical strategies of using Web 2.0 tools, according to Gomes (2005) and Daffy & Bruns (2006)

Blogs:

Pedagogical strategies: Blogs as a space of access to specialized information; Blogs as a space to provide information by the teacher; Blogs as digital portfolio; Blogs as a space for exchanging experiences and collaboration; Blogs as a space for promoting discussion; Blogs as a space for integration...

Wikis:

Pedagogical strategies: Wikis as a space to develop projects or activities in small groups; wikis as a space for collaborative writing; Wikis as a space to develop research projects; Wikis as a space to work a part of a joint project of the class or to create and maintaining the Website of the discipline or course; Wikis as a space to organize concepts for brainstorming...

Conceptual Framework

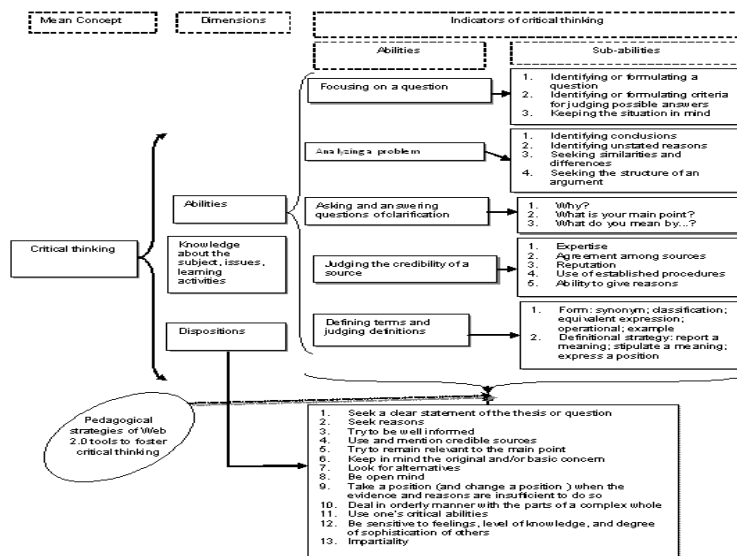
Critical thinking

- Is a reflective thinking and reasonable decision that's focused on what is intended to believe or do (Ennis, 1985).
- A conceptualization of critical thinking that focuses only on cognitive skills it is incomplete (Giancarlo & Facione, 2001)
- Critical thinking should cover skills and dispositions (Vieira, Tenreiro-Vieira & Martins, 2011).
- Cognitive skills are the mental skills and the attitudes that a critical thinker should display to justify a reasoned explanation of what he thinks (Facione, 2006, 2009).
- Dispositions of critical thinking are the individual attitudes that are oriented to particular standard of intellectual behaviour (Tishman & Andrade, 1996).
- The skills are related to the more cognitive issues, while dispositions to the more emotive aspects (Vieira *at al.*, 2011).

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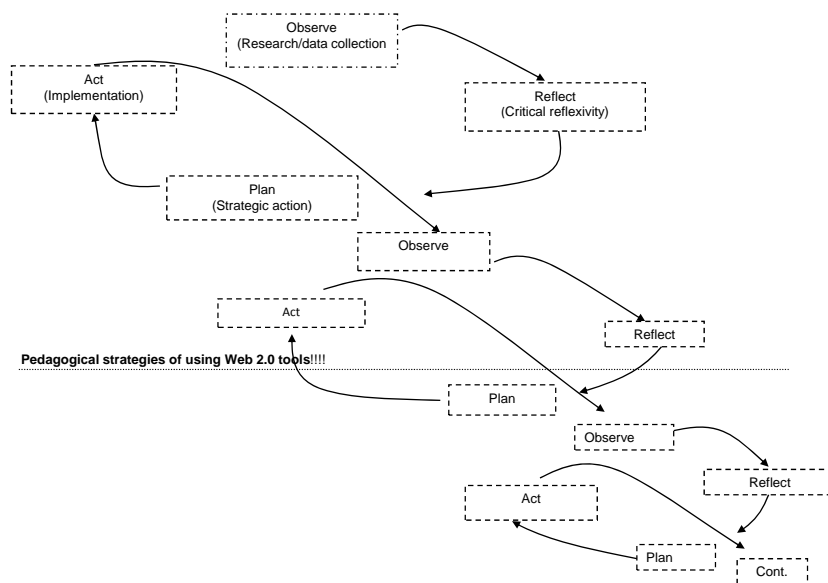
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Framework to foster student's critical thinking adapted from Ennis (1987)



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Action research methodology: adapted from O'Leary's cycles of research (Koshy, 2005:7)



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Description of the participants

- 14 students registered for the academic year (2009/2010) in the master's program in Adult Education
- All students registered for the compulsory module Professional Development and Lifelong Learning, which is part of the specialization phase offered in the second year of the program.
- 9 students were female and 5 were male, with ages ranging from 26- 46
- 8 students played the role of teachers, 2 are military and the remaining 1 for each are technical professional relationships, documentaries, scientific researcher and marketing adviser.

Description of first iteration

- The learning intervention was created using Web 2.0 tools such as blogs and wikis and followed the four stages of the O’Leary’s cycles of research as mentioned earlier.
- The implementation stage took three weeks and half, from 17 May to 11 June 2010.
- The class was divided into teams of 3 to 4 members that composed 4 groups. All learning activities were performed in the blogs and wiki as illustrated in the following slide.

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Week	Themes	Actions
17/05 21/05	Web 2.0 tools: Training on the creation of blog and wiki	<ul style="list-style-type: none"> ➢Administration of questionnaire ➢Creation of working groups ➢Collaborative decisions of the assessment criteria ➢allocation of the working themes ➢Training on the use of blog and wiki ➢Practice on the creation of blog and wiki through the following services: www.wikis.uem.mz and www.blogs.uem.mz ➢The students were encouraged to create an email account
	Social developments in the relationship between learning and work	<ul style="list-style-type: none"> ➢Reading and synthesizing Martins (1999) chapter – Individual task in the group’s blog ➢Discussion about “social developments in the relationship between learning and work and its consequences for the Adult Education” – task in to blog of discussion ➢Research articles and relevant websites on the Internet in order to sustaining the debate’s topic in into blog of discussion ➢Lecturer have provided a controversial question about the theme in order to generate discussion in the class blog ➢Topic to be developed in group of students in the wiki of the class
24/05 28/05	Learning at work: human resource development	<ul style="list-style-type: none"> ➢Compose a list of questions about practices of Human Resource Development (HRD) based on the available literature. Make a visit to one Department of Human Resource Development and interview a person about his/her HRD practices. Examine the practices of Human Resource Development obtained and then write an essay that analyzes and proposes to improve these practices - task in group of students into Wiki of the class ➢Lecturers provided a controversial question on the topic in the class blog in order to generate discussion ➢Research articles and relevant websites on the Internet about the topic order to argue the question ➢Topic to be developed in group of students into Wiki of the class
	Learning for obtaining employment: vocational training projects	<ul style="list-style-type: none"> ➢Make a visit to a place of training / vocational education and making analysis of its functioning by linking it to the labour context ➢Lecturers provided a controversial question on the topic in the class blog to generate discussion ➢Research articles and relevant websites on the Internet about the topic in order to sustain the question ➢Topic to be developed in group of students in the class’s Wiki
31/05 04/06	Tools for educators: skills and competencies	<ul style="list-style-type: none"> ➢Interview given to an employee of a company to obtain information on the competencies required in this enterprise, in order to develop the corresponding competence profile ➢Lecturers will provide a controversial question on the topic in the class blog to generate discussion ➢Research articles and relevant websites on the Internet about the topic in order to sustain question ➢Topic to be developed in group of students in the class’s Wiki
	Finalizing all tasks	Making consultation to the lecturers
07/06 11/06	Presenting the final product- wiki of the class	<ul style="list-style-type: none"> ➢Presentation of the final product – Wiki of the class ➢Administration of interviews to the students

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- 14 questionnaires were administered to students in order to attain evidences about their level of knowledge and skills on ICTs and later offered training on the use of blogs and wikis.
- 14 interviews were undertaken during the last week of the class. The interview aimed to understand and evaluate to what extent the students have developed a range of critical thinking abilities during the running module. All interviews were recorded and transcript.
- The researcher played a dual role of lecturer as well as researcher, having taught in collaboration with the lecturer of the module, in the mode of *blended learning* by using pedagogical strategies of Web 2.0 tools.
- 4 blogs of groups with the purpose of synthesizing Martins' chapter; a blog for promoting debates about controversial issues and a wiki for the class that served as a small digital repository were created as the pedagogical strategies.

Preliminary findings and discussion

- Indicators of critical thinking abilities and dispositions (*adapted from Ennis, 1987*) were observed in the blogs of discussion, blogs of groups and wiki of the class.
- Similar data from blogs, wiki and interviews were analysed and clustered in the same categories by the help of NVivo8 Software.
- The following table illustrates coding references added to a portion of texts that corresponding to each category of critical thinking abilities.

Table 1: Critical thinking abilities Vs Types of documents

Categories of critical thinking abilities	Coding References		
	Blogs	Interviews	Wiki
Pay attention to different perspectives	0	3	0
Explaining arguments by examples	6	0	11
Identifying conclusions	1	0	13
Identifying unstated reasons	26	0	0
Look for contradictions	7	10	1
Seeking differences	1	3	11
Looking at the structure of an argument	4	0	0
Seeking similarities	0	3	2
Synthesizing or summarize	13	11	0
Be confident on the reasons stated	0	8	0
Assessing credibility of sources	63	13	187
Definitional strategy	12	0	38
Form of the definition	6	0	7
Making value judgments	1	0	0
Asking and answering questions of clarification	3	5	0
Analysing a problem	0	0	6
Identify and formulating criteria for judging arguments	6	11	0
Formulating a problem	0	0	19
Identifying or formulating a question	20	12	10
Individual perspectives	0	7	0
Total /Categories	169	86	305

- In short, it can be said that the wiki (305) was the tool that most promoted critical thinking abilities in the student's activities when compared with blogs (169). This does not mean that this process cannot happen in the reverse way. Once the promotion of critical thinking abilities depends largely on how the pedagogical strategies of Web 2.0 tools are planned.
- In general the interviews revealed that the students paid attention to different perspectives posted by the various groups of work into blogs and wiki. As they had to moderate and assess the debates into blogs, for example, it was required more attention to judge the possible arguments.
- However the observations into blogs and wikis revealed that the students experienced obstacles such as phrase breaking syntax errors, errors of quotations and references, misspellings and stress, lack of textual coherence, difficulties in editing texts, in clearly define criteria for judging possible answers from controversial issues and in formulating a question.

Table 2: Critical thinking abilities Vs Controversial questions and Discussion themes

Critical thinking abilities	Coding References							
	Cq-1	Cq-2	Cq-3	Cq-4	Dt-1	Dt-2	Dt-3	Dt-4
Pay attention to different perspectives	0	0	0	0	0	0	0	0
Explaining arguments by examples	6	0	0	0	3	1	4	2
Identifying conclusions	0	0	1	0	1	0	2	1
Identifying unstated reasons	4	11	5	6	0	0	0	0
Look for contradictions	4	3	0	0	1	0	0	0
Seeking differences	0	1	0	0	4	0	2	4
Looking at the structure of an argument	0	0	2	2	0	0	0	0
Seeking similarities	0	0	0	0	0	0	1	0
Synthesizing or summarize	2	1	0	0	0	0	0	0
Be confident on the reasons stated	0	0	0	0	0	0	0	0
Assessing credibility of sources	5	20	5	7	16	8	14	12
Definitional strategy	4	6	0	2	0	0	4	6
Form of the definition	0	5	1	0	0	0	3	2
Making value judgments	0	1	0	0	0	0	0	0
Asking and answering questions of clarification	3	0	0	0	0	0	0	0
Analysing a problem	0	0	0	0	0	0	0	0
Identify and formulating criteria for judging arguments	2	1	2	1	0	0	0	0
Formulating a problem	0	0	0	0	0	0	0	0
Identifying or formulating a question	5	8	5	2	0	4	0	3
Individual perspectives	0	0	0	0	0	0	0	0
TOTAL/Coding References	35	57	21	20	25	13	30	30

In general, the preliminary findings in Table 2 shows that both the controversial questions developed into blog as well as the discussions topics undertaken into wiki may allow coordinating the various critical thinking abilities.

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Table 3: Critical thinking dispositions Vs Types of documents

Critical thinking dispositions	Coding References		
	Blogs	Interviews	Wiki
Impartiality	1	0	0
Deal in orderly manner with the parts of a complex whole	3	0	0
Improve formulation of the reasoning and argument	0	14	0
Look for alternatives	5	0	0
Seek a clear statement of the thesis or question	12	0	0
Seek as much precision as the issue permits	2	0	0
Seek reasons	26	0	0
Be sensitive to the feelings, level of knowledge and degree of sophistication of others	1	0	0
Try to be well informed	7	0	0
Try to remain relevant to the main point	0	0	0
Be open-minded	16	8	0
Keep in mind the original and /or basic concern	9	1	0
Take a position (and change a position) when the evidences and reasons are sufficient to do so	0	0	0
Use one's critical thinking abilities	3	0	0
Use and mention credible sources	177	0	262
TOTAL/Coding References	262	23	262

In general, the total coding references (262) both for critical thinking dispositions promoted into blogs as well as into wiki are the same. However, looking at the distribution of promoted dispositions both into blogs as into wiki, can be observed that the blog allowed to coordinate different dispositions (12) when compared with wiki that only coordinated just one (1)

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Table 4: Critical thinking dispositions Vs Controversial questions and discussion topics

Critical thinking dispositions	Coding References							
	Blog				Wiki			
	Cq-1	Cq-2	Cq-3	Cq-4	Dt-1	Dt-2	Dt-3	Dt-4
Impartiality	1	0	0	0	0	0	0	0
Deal in orderly manner with the parts of a complex whole	0	0	1	2	0	0	0	0
Improve formulation of the reasoning and argument	0	0	0	0	0	0	0	0
Look for alternatives	0	0	5	0	0	0	0	0
Seek a clear statement of the thesis or question	4	2	5	1	0	0	0	0
Seek as much precision as the issue permits	0	0	2	0	0	0	0	0
Seek reasons	4	11	5	6	0	0	0	0
Be sensitive to the feelings, level of knowledge and degree of sophistication of others	1	0	0	0	0	0	0	0
Try to be well informed	2	2	3	0	0	0	0	0
Try to remain relevant to the main point	0	0	0	0	0	0	0	0
Be open-minded	4	3	9	0	0	0	0	0
Keep in mind the original and /or basic concern	1	3	3	2	0	0	0	0
Take a position (and change a position) when the evidences and reasons are sufficient to do so	0	0	0	0	0	0	0	0
Use one's critical thinking abilities	0	0	3	0	0	0	0	0
Use and mention credible sources	14	31	7	9	22	9	26	27
TOTAL/Coding References	31	52	43	20	22	9	26	27

In general, the preliminary findings in the Table 4 show that both the controversial questions into blogs as well as the discussions topics into wiki promoted critical thinking dispositions. Besides this, it can be concluded also that the controversial questions in Table 4 appears to be the learning activities that better allowed the students to coordinate different dispositions of critical thinking when compared with the discussion's topics which illustrates only the occurrence of the disposition "use and mention credible sources".

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Preliminary conclusions

- Preliminary findings demonstrated that it is possible to promote critical thinking abilities and dispositions in the students by means of the use of some pedagogical strategies of Web 2.0 tools, such as blogs for discussion, blogs of groups and wiki of class. However it is essential that these strategies include learning tasks that focus on critical thinking. This agrees with Vieira, Tenreiro-Vieira & Martins (2011) who affirm that the teaching strategies as well as the learning activities should involve critical thinking.
- Although the preliminary findings reveal that the use of pedagogical strategies of Web 2.0 tools in the module promotes student's critical thinking and dispositions, it was verified that the participants experienced obstacles during the implementation stage of the first iteration. Obstacles such as phrase breaking syntax errors, errors of quotations and references, misspellings and stress, lack of textual coherence, difficulties in editing texts, in clearly define criteria for judging possible answers from controversial issues and in formulating a question impacted negatively on the quality of responses to the problem and therefore the answers to research question. These reasons led to the decision to make some changes from one implementation cycle to the next one.
- Lastly, the study concluded that the model adapted from Ennis (1987) was fundamental to verify the occurrence of abilities and dispositions of critical thinking into blogs and wiki.

Questions

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Thank you for your attention!