



Avaliação em educação

The integration of ICT in the new Timorese General Secondary Curriculum

Margarida Lucas

CIDTFF - Research Centre "Didactics and Technology in Education of Trainers"
University of Aveiro
mlucas@ua.pt

Carlos Santos

CIC-DIGITAL – Center for Research in Communication, Information and Digital Culture
University of Aveiro
carlossantos@ua.pt

Abstract

This article aims to describe the implementation of Multimedia Technologies, a subject from the new Timorese General Secondary Education curriculum. Data was collected from several participants via document analysis, direct observation, interviews and focus groups. Results point to the need to equip schools with suitable infrastructures for implementing the subject in question, such as electrical and telecommunication facilities and equipping schools with computer labs. They also point to the lack of trained teachers and the lack of initial training courses that can help bridge this gap. They still reveal that it is desirable to keep providing continuous training to all teachers teaching the subject, from all districts, regardless their professional category (permanent or contract teacher).

Keywords: Multimedia Technologies; Curriculum; General Secondary Education; Timor-Leste; Information and Communication Technologies.

Resumo

O presente artigo pretende descrever como decorreu a implementação da disciplina de Tecnologias Multimédia do novo currículo do Ensino Secundário Geral de Timor-Leste. Os dados foram recolhidos junto de vários participantes e por diversas vias, incluindo a análise documental, a observação direta, o inquérito por entrevista e por *focus group*. Os resultados apontam para a necessidade de dotar as escolas com infraestruturas adequadas à implementação da disciplina em causa, como sejam rede elétrica e de telecomunicações e de equipar as escolas com laboratórios de informática devidamente apetrechados. Apontam também para a falta de professores formados para lecionar esta disciplina e a inexistência de cursos de formação inicial que a possam ajudar a colmatar. Revelam ainda que é desejável dar-se continuidade à formação contínua ministrada até então, para que a mesma chegue a todos os distritos do país e a todos os professores que se encontram a lecionar a disciplina independentemente do seu vínculo profissional.

Palavras-chave: Tecnologias Multimédia; Currículo; Ensino Secundário Geral; Timor-Leste; Tecnologias



da Informação e Comunicação.

Resumen

Este artículo pretende describir cómo se llevó a cabo la implementación de la disciplina de Tecnologías Multimedia del nuevo currículo de Educación Secundaria de Timor-Leste. Se recogieron datos de varios participantes a través de análisis de documentos, observación directa, entrevistas y grupos focales. Los resultados apuntan a la necesidad de dotar a las escuelas con las infraestructuras adecuadas para la implementación de la disciplina en cuestión, tales como redes eléctricas y de telecomunicaciones, y de equipar las escuelas con laboratorios de computación debidamente equipados. También apuntan a la falta de profesores capacitados y la falta de cursos de formación inicial que pueda ayudar a suplir esta falta. Revelan que es deseable mantener la formación continua a todos los profesores que enseñan Tecnologías Multimedia, en todos los distritos, independientemente de su vínculo profesional.

Palabras Clave: Tecnologías Multimedia; Curriculum; Educación Secundaria General; Timor-Leste; Tecnologías de la información y comunicación.

Introduction

Timor-Leste declared its independence from Indonesia in May 2002 after a brief UN Transitional Administration (UNTAET) following the 1999 referendum. Violence erupted after the referendum and the country's infrastructure including homes, buildings, water supply systems as well as nearly 100 per cent of the country's electrical grid and telecommunications network were destroyed (da Silva, 2009).

Having inherited an ideological poor quality education system (Beck, 2008) and a severely degraded telecommunication/school infrastructure, the Timorese authorities had to embark on a rebuilding process with limited financial resources, chronic shortages of trained staff/teachers, classrooms, didactic resources and restricted administrative capacity. The country has made considerable progress in improving school buildings, boosting school enrolment and reducing illiteracy (Boon & Kurvers, 2012; UNICEF, 2013) thanks to sound policy choices made by the government and substantial development assistance provided by bilateral and multilateral aid donors. Yet and despite significant efforts, 45% of its populations has no schooling (UNMIT, 2011), 16% has on average completed less than two years of schooling and only 33% has completed secondary education¹.

The rebuilding of the education system demanded, among other things, the creation of new curricula, particularly for the General Secondary Education (GSE). The new GSE curriculum was developed in collaboration and cooperation with the University of Aveiro (UA) (Martins & Ferreira, 2013) and includes 14 new subjects, one of which Multimedia Technologies (MT). Its implementation started in 2012 and was accompanied by continuous training of (future) Timorese trainers and intensive training courses for teachers. Training of Timorese trainers was provided by Portuguese trainers and

¹ Available at <http://www.education-inequalities.org/countries/timor-leste/#?dimension=sex&group=all&year=latest>



training of teachers was run by Timorese trainers with the supervision of Portuguese trainers².

The integration of Information Communication Technology (ICT) related subjects, as it is the case of MT, into countries that have seen the destruction of physical infrastructures for power and communications, as well as social infrastructures as those for education poses additional challenges, but also opportunities (Al-Debei & Al-Lozi, 2012; UIS, 2014). Based on the perception of different stakeholders, namely Timorese policy makers, Timorese teachers and students and the MT Portuguese trainer, this article aims at describing the implementation of the MT subject by focusing on two aspects: (i) school conditions and organization; (ii) initial education and continuous training of teachers. It presents partial results from a wider project that evaluated the impact of restructuring GSE in Timor-Leste (Albergaria-Almeida, Martinho & Cabrita, 2014).

Although ICT encompasses the more conventional technologies such as radio, television and telephone technology, this article refers to the 'new' technologies of computers, mobile phones and the Internet. The next section provides a brief overview of the status of ICT in Timor-Leste and the stage of its integration in Education. Then the MT curriculum is presented and the methodology adopted for the present study is established. After presenting results, we put forward some final considerations and a few recommendations.

Overview of the status of ICT in the country

The integration of ICT in education does not solely depend on introducing plans and policies, although these are necessary steps for change. It also relates to school organization and teacher variables (Eickelmann, 2011), but most essentially to basic infrastructures such as electricity that is regularly available and telecommunication facilities (Plomp, Anderson, Law, & Quale, 2009; UIS, 2014). Since its first National Development Plan from 2002, the Timorese vision for the telecommunication sector was based on developing good communication facilities throughout the country, with access to postal services, telephone, Internet, radio and television (GOTL, 2002). Much has been accomplished, but the ongoing challenges remain significant.

As to electricity, there is still an inadequate power supply infrastructure in the country's capital and an almost non-existent one in the rural areas. About 82% of households do not have access to electricity, and 98% use firewood, plant oils and batteries as their primary source of energy (UNDP-UNEP: PEI, 2012). Based on figures from the Census 2010, the electrification is mainly concentrated in urban areas, with the electrification rate being 88% in urban areas and 19% in rural areas (GOTL, 2010). A 24-hour electricity supply only exists in Dili and Baucau, although there is a high rate of outages, particularly in the evening. The electricity supply of rural Timor-Leste consists of 58 isolated grids, all equipped with diesel generators, but with some being inoperative, due to the lack of maintenance or fuel, or due to vandalism³.

The Communication and Media Survey by the United Nations Integrated Mission in Timor-Leste (UNMIT, 2011) assesses the extent of media coverage and audience reach/access to ICT in Timor-Leste. One of its major findings is that 16% of the population does not access any form of media (radio, television, newspapers, internet or mobile phones). Another major finding is that mobile phone use is increasing

² Information on the teacher training project is available at <http://www.pficip-esg-estv.com/>

³ Available <http://www.reegle.info/policy-and-regulatory-overviews/tl>



and mobile phones are becoming a significant communication tool. Different information sources (da Silva, 2009; UNMIT, 2011; Kelly & Souter, 2014) advance that the telecommunication sector has been expanding with the mobile telephone sector experiencing a strong growth, especially after the government opened the market to other operators, ending the monopoly held by Timor Telecom. Data available indicates that nearly 55% of the current population owns a mobile phone and that mobile voice coverage is offered in all 13 districts—covering 92.5% of the population (UNMIT, 2011; Kelly & Souter, 2014). 11% of mobile owners use mobile phones to access the Internet, but the majority (79%) accesses it from Internet cafés as only 0.5% of the population has Internet access at home (UNMIT, 2011). As to fixed phones, less than 1% of the population has one and landline connections available are mainly used for Internet access by governmental, corporate, and Non-Governmental Organization offices in Dili, as well as in some private homes (Kelly & Souter, 2014).

Barriers to mobile phone and Internet use are related with (i) high costs, which are extremely expensive relative to the average income of the people (da Silva, 2009; UNMIT, 2011); (ii) limitations in international broadband connectivity, which is currently provided only through satellite links (Kelly & Souter, 2014); (iii) lack of electricity, equipment, connectivity or location to access and (iv) language difficulties (UNMIT, 2011). Nevertheless, and despite aspects to be improved, the country has created the opportunity for its people and services to take advantage of more advanced ICT – such as broadband Internet and 3G mobile telecommunication networks. These constitute major steps for integrating ICT into education as they can be used for pedagogical or administrative purposes, communication between teachers, students, parents, local education authorities, and other administrative organizations. These may also provide the requisite infrastructure for Internet connectivity as, for instances, mobile phones can provide varying levels of broadband connectivity through 3G technology.

Stage of ICT in Education

The integration of ICT in education requires that governments adopt and develop ICT policies for their education systems and back them with substantial investments in ICT provision. It also requires the consideration of physical conditions, such as electricity and network supply points, computer labs, rooms for servers, placing cables, network points etc.; human resources to set up and maintain such infrastructures; financial resources to support the installation and maintenance of equipment; and well trained school teachers and leaders (UIS, 2014).

Along with a clearly stated vision for ICT use in education and adequate ICT infrastructure and support, school leaders and teachers are the key to ICT integration. School leaders need adequate training in order to be acquainted with the requirements of ICT integration, as well as to support teachers and changes in teaching practices in their schools. Teachers need training on ICT and ICT pedagogical use so that they can integrate it effectively into their teaching for the improvement of student learning (Anderson, 2010; UIS, 2014).

The last report from the Southeast Asian Ministers of Education Organization (SEAMEO) refers that Timor-Leste does not have an existing national ICT in education plan or policy and that ICT literacy development is not part of the national curriculum (SEAMEO, 2010). Things have changed in the meanwhile and the country has taken important steps to implement ICT in education plans and



policies, to modify curricula and to provide its people the opportunity to become digitally literate.

Timor-Leste's National Educational Strategic Plan (NESP) 2011-2030 includes a program to fully develop and install the ICT infrastructure and technical support needed to implement modern pedagogy and effective education management and planning (MOE, 2011). The initial efforts focus on introducing ICT as a fundamental management tool and on training ministerial staff and educational agents to appropriately use the technology in the normal day to day managerial activities. Despite no or limited access to ICT infrastructure and resources in schools, the country has already developed its Education Management Information System (EMIS), which collects important data for long-term planning, monitoring and evaluation, and operational management of the education system (Santos, Marwata & Sembiring, 2014). Data includes information on:

- (i) student enrolment (including name, date of birth, parent's names, parent's qualification, and to what grade and class the student has been assigned);
- (ii) teacher form (including teachers' qualifications, years of experience, and the grade, class and subject to which they have been assigned);
- (iii) annual school survey (including information on the physical structure of the buildings, the number, type and purpose of rooms per school in addition to facilities like water, furniture);
- (iv) student grade class assignment (including progress to next grades/levels, mortality, repetition, dropout or re-entry) and
- (v) teacher grade class assignment (including grades, class and subject they are teaching during a given school year).

Data is already being collected from schools, verified at district offices and then entered into a computer-based EMIS in the Ministry of Education. According to the model of stages of ICT adoption and use proposed by UNESCO, the aforementioned aspects put Timor-Leste at the emerging stage of ICT integration (SEAMO, 2010; Anderson, 2010). At this stage, schools are becoming aware of ICT and some begin to purchase, or have had donated, some computing equipment and software. Administrators and teachers are starting to explore the possibilities of using ICT for school management and although practices are still firmly grounded in traditional, teacher-centered practice, national policies and curricula are starting to reflect an increase awareness of the uses of ICT.

The NESP is very clear in its vision for its educational system, stating that its main objective is to enable students to develop relevant knowledge, useful capacities, creativity, problem solving skills, complex communication skills and critical thinking (MOE, 2011). To facilitate these achievements, it proposes the integration of technological activities into the official curriculum both as a subject in itself, as well as a means to help change the pedagogy prevalent in schools by moving from a transmission teacher directed methodology towards a greater focus on the individual learner. This vision is expressed in the new GSE curriculum and in the MT subject, a common subject for all GSE students. It is also expressed in initiatives put into practice so far, such as the teacher training programs offered to secondary school teachers.

In the next section, we provide an overview of this subject by presenting its main aims, the thematic units explored in each GSE school year and the didactic resources developed.



The new GSE curriculum: the case of Multimedia Technologies

The new GSE curriculum plan offers two educational paths: Sciences and Technology, and Social Sciences and Humanities. Both share a common set of subjects and each one includes specific subjects related to its area of studies. Framed by the assumptions advocated by the United Nations (2002a; 2002b), especially in what the Literacy Decade and the Decade of Education for Sustainable Development are concerned (as complements and follow ups of the Millennium Development Goals process and the Education for All movement), the main aims of the GSEC focus on students' competence, namely by (to name a few):

- ensuring the development of soft skills and specific literacies within different curriculum areas;
- developing language, communication and digital skills that enable participation in Timorese and the global society;
- improving young people's ability to mobilize and integrate knowledge that can contribute to the economic, social and environmental development of the society in which they live.

The new GSE curriculum takes digital competence as one of the five key-competences to be developed by students and is considered a transversal competence enabling the acquisition of the other key competences: languages and communication competence; social, civic and cultural competence; competence in science and technology and mathematical competence and competence in social sciences and humanities. Students should develop basic knowledge in ICT that enables them to make a confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society.

MT is one of the subjects comprising the common component of the GSE curriculum. The three-year program follows a structural logic that aims at the progressive acquisition of skills and knowledge, which means, for instances, that the thematic units (TU) (Table 1) included in the 10th grade are transversal and essential for the subsequent units (11th and 12th grades). Topics dealt with in the 10th grade relate to computers as "isolated" or non-connected working tools and are recalled throughout the following school years. Students are expected to learn about information systems, hardware and networks, operating systems and programs – and operating skills regarding productivity software.

TU	10 th grade	11 th grade	12 th grade
1 st	Computer basics	Internet basics	Social web
2 nd	Word processing	Image, audio and digital video	Collaboration and knowledge construction in the social web
3 rd	Spreadsheet software	Multimedia contents integration	Project development using the Web

Table 1 – Thematic units explored in each grade.

TU included in the 11th grade are dedicated to distributed spaces, such as the Internet its principles and



functioning, synchronous and asynchronous communication. In this grade students are expected to develop creative productivity by exploring curricular contents related to multimedia (image, audio and digital video) and its integration and distribution.

The 12th grade focus on the Internet, specifically on the World Wide Web, as a context for socialization, knowledge construction and as a tool for the support of economic activities. The last TU requires that students apply contents taught/learned throughout the three years to develop a project directed to the community under an entrepreneur logic.

As for other subjects of the new curriculum, didactic resources developed for MT include a student's book and a teacher's guide – one for each GSE grade. The student's textbooks cover TU presented in Table 1, practical exercises, tips to further explore contents and pictures to help students visualize and consolidate contents. The teacher's guide provides teaching and assessment strategies and methods for teachers to explore. It does not prescribe lessons or steps, but it gives suggestions on how, for instances, an exercise in the student's book can be explored and/or assessed. It also provides optional activities and additional tasks beyond those that appear in the students' book as well as background notes that explain MT concepts that some teachers may not be familiar with. Optional activities and additional tasks encourage articulation and collaboration with the other subjects of the new GSE curriculum, not only by promoting the general use of ICT for word processing, information retrieval or the use of communication tools, but also for exploring particular aspects related with each specific subject, such as spreadsheets in Mathematics, GPS in Geography or laboratory simulations in Physics or Chemistry.

The teacher's guide also includes a DVD that allows teachers to install Edubuntu on a computer. Edubuntu is the educational operating system that was chosen to support the MT curriculum. It is free and incorporates several communication and productivity tools.

Methodology

Data presented in this article pertains to a larger study entitled "Evaluating the impact of restructuring secondary education in East Timor – a study in the context of international cooperation" (Albergaria-Almeida et al., 2014). This study used a mixed methods case study to gain a comprehensive understanding of the new GSE curriculum implementation process. Data was collected through document analysis, semi-structured interviews and focus groups. Field notes were also taken during visits to schools and on activities observed both in and outside of classes. Data presented in this article pertains only to the implementation of the MT subject and relate to two aspects: (i) school conditions and organization and (ii) initial education and continuous training of teachers.

Participants in the study include policy makers: the directors of two government education departments (DE1 and 2), an assistant to one of the directors (AD) and a former Ministry of Education (FME); one school director (SD); the MT Portuguese trainer (PT), 161 Timorese students (TS) and 141 teachers (TT) from 9 schools (6 in Dili- 3 public and 3 private-, 2 in Liquiçá- one public and one private- and 1 public school in Ermera). Codes assigned under parentheses identify data sources in the next section.



Results

School conditions and organization

Most of the schools involved in the study still lack the basic elements to help build their ICT educational and administrative capacity, such as electricity, telecommunication facilities and appropriate rooms. One of the policy makers interviewed refers that “70% of the schools are already electrified, but the situation is more difficult in schools from rural and remote areas where we are trying to install solar panels” (DE1). Our visits to schools revealed that, even in the capital, not all schools have electricity and when they do, not all rooms have electricity supply points. Also, there is evidence that electricity supply is very unstable with power outages being very common. For instances, students from one of the schools stated that electricity was only available during part of the afternoon (FGS).

Most schools also lack computer labs. From the 9 schools visited only 2 (one public and one private, both in Dili) are equipped with a computer lab (Figure 1). The public school has “a room with 14 computers with Internet access that was offered by Timor Telecom” (PT). However, this room is rarely used for the MT subject mainly due to two reasons. One relates with the equipment itself which is “old, obsolete and, in most cases, unable to run the necessary software to teach most of the MT thematic units especially from the 11th and 12th grades” (PT). Another reason relates with the number of students per class: “How can you teach MT to 70, 80 students using 14 obsolete computers?” wonders the PT, but adds “at least students know what a computer lab looks like and have the opportunity to seat at a computer once in a while. That is a victory” (PT). At the time of our visit to this school, the computer lab was being used by a few teachers, but its set-up and desk arrangement did not suggest students’ use and it appeared to be in need of maintenance as, for instances, chairs were broken and ceiling lights did not work.



Figure 1 – Computer lab at a private school.

The private school has 50 computers, but “not all are working. Those that do not work are used to be disassembled and reassembled” (SD) by 10th graders. Computers in this school “are not connected to the Internet, although we have an agreement with Timor Telecom. We have been waiting for



more than a year, but there are more companies now and maybe we'll try an agreement with one of them" (SD). This school director has also "requested 5 computers to equip the library" as it is important that students have available computers to "write assignments requested by teachers or to access the electronic versions of the student's textbooks" (SD) that the school has⁴.

Data from focus groups conducted with students and from field notes taken reveal that despite not having computer labs for students, 3 other schools have computers for teachers to use and to be used for administrative issues. For instances, in one of the private schools visited, it was possible to observe a room with 10 computers. When questioned about this room, students referred that the computers did not work, that the room was closed and could not be used (FGS). In another private school, students mentioned that there were computers, but "the room is closed and only teachers can use them" (FGS). In one public school, students stated that "there are some computers that were donated by the Japanese, but only administrative staff is authorized to use them" (FGS). There is also the case of a school that does not have computers, because "they have been stolen" (FGS).

Apart from plans to improve security in schools by "building walls, install gates and fix windows and doors" (DE1), there are plans to equip schools with the necessary equipment to implement the MT subject

We have already bought more than 300 computers this year to equip 20 schools. We have also requested school directors to designate a room to be equipped and each school is going to receive 18 computers. Next year we will equip forty-five more, but only public schools, not private ones. (DE2)

In general, teachers agree that private schools provide better conditions for students, because they are more autonomous. They receive fees and also a subsidy from the government (FGT; DE2). On the contrary, for public schools "everything depends on the government budget and on its approval by the Parliament" (DE2). Some teachers fear that, though it is a very positive and needed measure, equipping schools with computers is likely to be insufficient for the sustainable implementation of the subject, unless a proper telecommunication infrastructure is installed, teachers and other staff with adequate training are recruited and training continues to be provided to those already teaching it (FGT).

The government also has plans for improving and constructing new schools, namely for the construction of a school model in each district (2 in Dili) that includes "sanitary infrastructures, electricity, a teachers' room, a library, a canteen, a music room and laboratories to reinforce the implementation of the new curriculum" (DE2). According to the Ministry of Education Plan for 2013-2017 (MOE, 2012), the first schools were to be built in Dili, Bobonaro and Ermera in 2014, followed by Baucau, Oecusse, Aileu and Manufahi in 2015. The remaining districts would receive model schools in 2016 and 2017. Despite intentions, the construction of model schools has not started yet.

Another aspect hindering implementation is the way each school organizes itself in terms of teaching service distribution. In what MT is concerned and as there is a shortage of qualified teachers, the teaching of MT depends on the school director's decision. Any teacher may end up teaching this subject, because he/she "does not have enough hours to complete a full-time workload" (FGT)

⁴ Student's textbooks and teacher's guides for the new GSE curriculum are available for download at www.ua.pt/esgtimor.



or simply because he/she "has a laptop" (PT). There is also a lack of technical support specialists, who are essential to the continued viability of ICT use. Teachers mention that teachers assigned to teach MT often "lack the general competences that are required to install, operate, and maintain equipment" (FGT). Also disabled computers end up being useless as there is "no one who knows how to disassemble or repair them" (FGT).

Therefore, policy makers interviewed recognize that school directors must be leaders and know how to lead teachers, students and other staff; they must also work as managers, as they need to manage schools, budgets and human resources. As such, it is essential that they are selected based on a specific profile and receive adequate training to accomplish their tasks and make the best use of their physical, financial and human resources.

Initial education and training

Training is considered "the biggest challenge for the implementation of the new curriculum" (DE1) by all the policy makers interviewed and that is why it "has been a major concern and an area that has received a lot of investment" (FME) since the rebuilding of the education system began. All believe that "teachers need higher education training" (AD) because very often they lack "the basics to understand contents" (AD). And the need for training goes beyond "continuous training. They need competence and competence to teach does not come from life experience" (AD).

The need for specialized teachers is particularly evident for the new GSE curriculum subjects, such as MT, as "universities do not prepare teachers. Who is going to teach it? Can we recruit someone with a six, seven-month training course? That person is not prepared to teach" (DE2). Therefore, "we need to align initial teacher education courses and programs with the new curriculum" (AD) and continue to "provide training to teachers so that they can be better prepared and teach our students better" (DE1).

From schools participating in the study only one, a private one, recruited two teachers to teach MT, but "their degree is in Information Technology" (SD) and therefore "they lack proper pedagogical and didactical training" (SD). In the other schools MT was distributed among existing teachers. In these cases, there are teachers with a degree in Mathematics, Physics, Chemistry or Economics teaching MT (FGT). One of these teachers complaint that "MT subject matter is very difficult to teach. There is no equipment and although the student's book has a lot of pictures, students want and need to experiment and practice with computers" (FGT).

Regarding training to use the students' textbook and the teachers' guides, some of the interviewees refer that didactic resources are not adapted to Timorese reality, because they suggest the use of Edubuntu and most teachers use Windows (SD; FME). This poses additional problems to teachers "as they use another software and lack experience in working with the new one" (FME) and "training provided is not sufficient to cover everything" (PT). The choice for Edubuntu was made based on its open source nature, which makes it possible to integrate developments more easily and allows for significant savings in setup and maintenance costs. Data from other studies reveal that as there are no copyright laws in Timor-Leste, computer software, including Windows, installed in computers is usually pirated and sold in stores without restriction (da Silva, 2009). In addition, there has been a growing support for the distribution of the Ubuntu software, including to educational institutions, and training is also offered to users (da Silva, 2009).



Some of the MT teachers that participated in focus groups were asked if they had received any training to teach this new subject. Most did not have any training as this was their first time teaching it (FGT). The Portuguese trainer, responsible for supervising intensive courses for teachers details the situation.

The problem with the training courses for MT teachers is that attending teachers come from very different backgrounds with no knowledge of ICT. There are English, Mathematic teachers even Physical Education teachers...But what surprises me most is that the majority of teachers attending the MT courses in a given year is not assigned to teach MT the following year and this is a huge waste of financial and human resources. (...) Another thing is that intensive courses for teachers do not precede the school year, i.e., teachers begin the school year without having received any training. (PT)

In 2012, training focused on the thematic units for the 10th grade. Only seven teachers attended the training course: "disclosure of the training course for teachers was blocked in several places and the information never got to schools" (PT). In 2013, training focused on the 11th grade and in 2014 on thematic units for the 12th grade. Twenty-four teachers attended each training course, but attendance "was very low, because only permanent teachers could participate, which meant that teachers with a contract could not participate in the training course" (PT). The reduced number of trainees can also be related with the fact that "permanent teachers do not only teach MT. They also teach other subjects related with their specific areas" (PT), and it is possible that they could have attended training courses in other subject areas.

MT classroom teaching is thus very much teacher-centered and strategies adopted are based on transmissive and reproductive teaching methods. Results suggest that classes are mostly based on the oral and sequential explanation of contents which may follow the resolution of exercises/activities suggested in textbooks for those who have the necessary equipment. In general, students refer that classes are spent reading or copying information from the board. A student explains how their MT class is run: "the teacher or one of the students writes information from the student's textbook on the board and then we copy it in our notebooks (Figure 2). We never had a practical class, because there are no computers to practice" (FGS). This situation was observed in one of the visited schools: MT was being taught by the Portuguese language teacher, who was reading the students' textbook and copying information to the board.

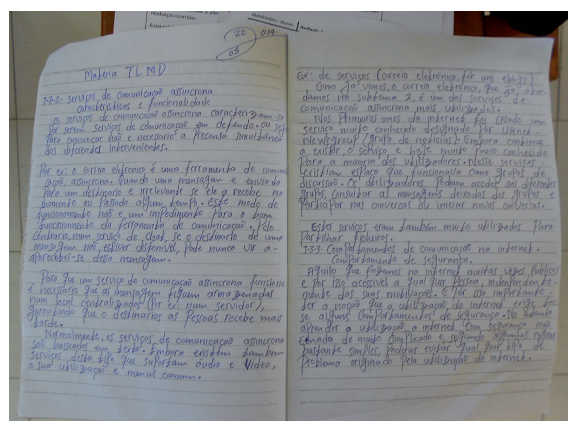


Figure 2 - Student's notebook depicting a MT lesson.

There are also students, from different schools, referring that they have no MT teacher or that their MT teacher is usually absent from the classroom. In some cases, the MT class is never taught while in others students use available textbooks to learn. There are several students referring the use of mobile phones to access the Internet in order to “search the Web”, “visit sites proposed in the textbook” or just visit “social networking” sites (FGS). It is possible that, like many other children and youth from neighboring countries, Timorese students learn more about how to use ICT informally outside of the school system than in the classroom (UIS, 2014).

Final considerations

Since 2002, Timorese authorities have invested heavily in improving the country's educational system. Schools have been rebuilt, curricula have been restructured and educational standards for the population have been improved. ICT in education plans and policies have also been implemented which include, for instances, a program to develop and install an ICT infrastructure and the technical support needed to implement modern pedagogy, effective education management and planning or an ICT related subject (MT) in its new GSE curriculum.

Nevertheless, as the country's educational system faces basic needs such as access to basic infrastructures, including electricity and telecommunication facilities, computer labs, computers and qualified staff, including teachers, the implementation of the new MT curriculum is an ongoing challenge. Results show that most schools are not electrified and lack telecommunication facilities and connectivity. Schools equipped with a computer lab lack modern equipment and technical staff to cater for its maintenance. There is also a shortage of qualified teachers to teach the new subject, which generally results in an inappropriate service allocation among existing teachers. Timorese higher education institutions do not prepare teachers for the new subject and ICT training is not part of the existing teacher education courses.

Policies developed for the Timorese education system should be backed by relatively substantial



investments in ICT provision, predominantly basic infrastructure. Investment should also cover the enhancement of conditions at existing schools, namely by constructing new schools, improving school buildings, increasing the number of classrooms and installing computer labs. The initial education and the continuous training of teachers, as well as the training of technical staff and school leaders, should continue to be a priority. Until the existing initial education programs do not prepare teachers to teach MT, in-service teachers allocated to teach this subject should receive continuous training and support. Moreover, training provided should reach all MT teachers and cover all districts.

Acknowledgments

This work is a result of the project 'Evaluating the impact of restructuring secondary education in East Timor – a study in the context of international cooperation' supported by the Portuguese Foundation for Science and Technology (FCT) under Grant PTDC/MHC-CED/5065/2012, by the Operational Competitiveness Programme (COMPETE) and by the European Regional Development Fund (FEDER).

References

- Albergaria Almeida, P., Martinho, M., & Cabrita, I. (2014). Evaluating the impact of restructuring Secondary Education in East Timor. *Procedia –Social and Behavioral Sciences*, 141, 665-669.
- Al-Debei, M. M., & Al-Lozi, E. M. (2012). Implementations of ICT innovations: A comparative analysis in terms of challenges between developed and developing countries. *International Journal of Information, Business and Management*, 4(1), 224-252.
- Anderson, J. (2010). *ICT Transforming Education: A Regional Guide*. Bangkok: UNESCO.
- Beck, M. (2008). The context and history of the education sector in Timor-Leste. In J. Earnest, M. Beck & L. Connell (Eds.), *Rebuilding Education & Health in a Post-Conflict Transitional Nation - Case Studies from Timor-Leste* (pp. 9-22). Rotterdam: Sense Publishers.
- Boon, D. & Kurvers, J. (2012). Adult literacy in multilingual Timor-Leste: First results of a study. In M. Leach, N. C. Mendes, A. C. da Silva, B. Boughton & A. Da Costa Ximenes (Eds.), *New research on Timor-Leste* (pp. 349-354), Hawthorne: Swinburne Press.
- da Silva, A. P. (2009). TL: Timor-Leste. In P. B. Arinto & S. Akhtar (Eds.), *Digital Review of Asia Pacific 2009-2010* (pp. 351-357). Sage Publications.
- Eickelmann, B. (2011). Supportive and hindering factors to a sustainable implementation of ICT in schools. *Journal for Educational Research Online*, 3(1, 75-103).
- Government of Timor-Leste (GOTL). (2002). *National Development Plan*. Retrieved from <http://www.pm.gov.tp/ndp.htm>
- Government of Timor-Leste (GOTL). (2010). *Highlights of the 2010 Census Main Results in Timor-Leste*. Retrieved from http://www.statistics.gov.tl/wp-content/uploads/2014/03/English_Census_Summary_2010_2.pdf
- Kelly, T., & Souter, D. (2014). *The Role of Information and Communication Technologies in Postconflict Reconstruction*. Washington DC: The World Bank.



Martins, I.P., & Ferreira, A. (2013). A reestruturação curricular do Ensino Secundário Geral de Timor-Leste. Um caso de cooperação da Universidade de Aveiro no domínio da educação. In C. Morais, & R.L. Coimbra (Eds.). *Pelos Mares da Língua Portuguesa I* (pp. 97-110). Aveiro: Universidade de Aveiro.

Ministry of Education (MOE). (2011). *National Education Strategic Plan 2011 – 2030*. Timor-Leste: Ministry of Education. Retrieved from <https://www.moe.gov.tl/pdf/NESP2011-2030.pdf>

Ministry of Education (MOE). 2012. *Plano do Ministério da Educação 2013-2017*. Díli.

Plomp, T., Anderson, R. E., Law, N., & Quale, A. (2009). *Cross-national information and communication technology: policies and practices in education*. (Eds.). Charlotte, N.C.: Information Age Publishing.

Southeast Asian Ministers of Education Organization (SEAMEO). (2010). *Status of ICT Integration in Education in Southeast Asian Countries*. Bangkok: SEAMEO.

United Nations Children's Fund (UNICEF). (2013). *UNICEF Annual Report 2013 - Timor-Leste*. New York: UNICEF. Retrieved from http://www.unicef.org/about/annualreport/files/Timor-Leste_COAR_2013.pdf

United Nations Development Programme - United Nations Environment Programme: Poverty-Environment Initiative (UNDP-UNEP: PEI). (2012). *The context of poverty-environment mainstreaming in Timor-Leste*. Retrieved from http://www.unpei.org/sites/default/files/country_factsheets/Fact%20Sheet_Timor%20Leste_2011.pdf

United Nations Educational, Scientific and Cultural Organization Institute for Statistics (UIS). (2014). *Information and Communication Technology (ICT) in Education in Asia: A comparative analysis of ICT integration and e-readiness in schools across Asia*. Quebec: UNESCO-UIS

United Nations Integrated Mission in Timor-Leste (UNMIT). (2012). *Timor-Leste Communication and Media Survey*. Díli: UNMIT.

Santos, A. T., Marwata, M., & Sembiring, I. (2014). EMIS Information Systems Audit on the Timor-Leste Education Ministry with a COBIT4. 1 Framework. *International Journal of Computer Applications*, 89(5), 20-30.