What can be learnt from the use of Information and Communication Technologies (ICT) in Special Needs Education (SNE) in the Netherlands?

What suggestions can be made to improve the use of ICT on SNE in Portugal?

(Extended Abstract)

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Abstract. As governments try to improve social inclusion of the handicapped ones, special needs education (SNE) is increasingly receiving attention and investment. Most of the progress on SNE is due to advanced and innovative implementation of information and communication technology (ICT).

The ICT usage on SNE presents some challenges. It is difficult to assess the current use of ICT because it is not even throughout countries, and regions, with different budgets for SNE. Although ICT is quite advanced in the education area, it tends to be introduced in schools without any planning or training, making its implementation not so effective.

Netherlands and Portugal represent two unique study cases for this investigation. The Netherlands has a well developed education system while Portugal, due to the economic difficulties, has an unadvanced education system with insufficient financial support.

This study will provide: a deep analysis of the use of ICT in the particular case of the Netherlands; which benefits this analysis can bring to the SNE in Portugal; and which ICT's can be used to innovate SNE in both countries.
1 Introduction

SNE is being highly improved with the use of ICT more and more every day. As a measure to improve the social inclusion of handicapped persons, governments and public organizations like UN and UNESCO, are promoting the implementation ICT in SNE (UNESCO, 1994) (UN, 2006) (WHO, 2007) (Portuguese Republic Diary, 2008) (WHO, 2001) (Watkins, 2011). The ultimate goal is to achieve a standardized level of ICT use, common to all countries.

Despite all efforts, there is still a long way until a state of equality in the use of ICT on SNE is reached. Some ICT technologies are used due to local initiative (by institutions or schools) instead of a central one (by public organizations or governments). Thus, not only countries with different budgets use different ICT’s, but also different schools inside the same country (highly developed urban environments versus low development rural ones) with different budget sizes have different ICT’s in use.

Thus, ICT’s are scattered through the countries in an uneven disposition. It is difficult to assess the global current state of ICT use in SNE because this use is not completely centralized.

One last issue concerns with the ability of the teachers and schools to correctly use ICT as a tool for learning. In many cases ICTs are acquired without any planing or training, which results in an ineffective education.

2 ICT on SNE

In an early stage of the analysis of this subject, the main goal was to find “How is ICT being used on SNE in different countries?”. The focus at this stage was to identify technology gaps between countries and comparing their requirements, effectiveness and viability within the SNE scope. Ultimately, the main goal was to gather the best ICT practices (and related information) so they can be better employed in the future.

A quick and superficial comparison between Netherlands and Portugal for the use of ICT in SNE reveals that these are much scarce and unadvanced in Portugal. I realized that the presence of ICT on SNE on both countries is completely different and that Portugal could greatly benefit from analyzing how is ICT being used in The Netherlands.
This represents an unique opportunity to contribute for the development of the portuguese SNE situation. Not only, the dutch SNE could also benefit from a critical analysis regarding the use of ICT.

3 SNE situation in Portugal

In Portugal up until now, the majority of SNE was provided by semi-private SNE schools, for public use, which were mainly funded by the government. However, SNE will no longer be provided in these schools as the policy is transiting from special education to inclusive education.

Luis Azevedo, Assistive Technology Researcher at IST and CEO of ANDITEC – one of the main Portuguese suppliers of special needs ICT (Anditec), informed me that from his personal experience, private schools are not interested in spending their budget in expensive ICTs and therefore, the public schools (which are funded by the government) are the ones having the best ICTs at disposal in Portugal.

Luis also informed me that, for many years now, many Portuguese pupils with disabilities have adequate technological support. Although an increase in the Portuguese SNE quality is noticeable, the system still has a big lack of funding, which is reflected as a reduced and poor use of ICT in education.

3.1 Notes on ICT application

From the SNE situation in Portugal, it is important to note that the three main areas of ICT application in an education system (Learning, Management, and Indication) are not explored.

The Learning area, at the current moment, does not play a vital role, even though professionals state that it would bring great benefits and highly improve the general education of pupils.

The management area has no innovation yet. Schools only use regular organizational management systems that do not directly add value to the education process.

Regarding the indication area, until recently, parents and pupils had to find a suitable school individually; the school would then decide if the pupil could

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1 This information is part of an interview with Luis Azevedo, which is available as Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.. Error! Reference source not found.Error! Reference source not found.

2 The government does not fund Private SNE schools. These are schools that require the parents to pay a fee that covers the education costs.
be accommodated there or not. With the transition to the inclusive education system, it is unclear how pupils are assessed for their special needs and how their education career is decided.

4 SNE situation in the Netherlands

In the Netherlands, special education is provided public and freely through public schools or other types of private, non-profit school boards. It is similar to the Portuguese situation, after the transition to “inclusive education”. A big part of the education is provided with the support of ICTs. These are common in every school; there is almost one computer per pupil in the classroom.

Every normal child is entitled to regular education, provided by the Dutch Education Ministry. Every child with special needs is entitled to: i) SNE, this is, a place in a school adequate to the child’s special needs; and ii) an adequate amount of money to support the special needs the child has, a backpack, as it is called. This backpack is to be used by the pupils’ school, to provide appropriate SNE (ICTs included). It is funded by the Dutch Education Ministry to ages 4-12 (SBO), and funded by the Dutch Wellbeing Ministry to the ages 11-16 (SO).

Every child is evaluated by an arbitration committee (AC), which evaluates the child’s special needs and decides on the size of the backpack. This system has proven to be effective for most of the children; however, there are some loopholes in the system.

With the current Dutch education system, there are some children, with special needs (but not only), that get lost in the system. Sometimes the school where a pupil is currently attending says that he/she needs SNE, however, the AC determines that the pupil does not needs SNE. At this point this pupil is lost in the system, he/she cannot go to a regular school, and cannot either go to a SNE school. Also, when a pupil ends the first stage of the education, primary education (PO), and is assessed by the AC again before the next stage, he/she might lose the status of SNE pupil (for instance, due to not very accentuated disabilities, the AC might think the pupil does not need SNE anymore). This means that a SNE pupil on primary education is now considered a regular pupil. This might be correct in some cases, nevertheless, in other cases pupils that need SNE education will be lost in the (regular) education system.
4.1 Notes on the ICT application

The Dutch education system has been exploring and bringing innovation to the three main areas of ICT.

The Learning area is the most advanced; ICT plays a vital role in the learning experience of all pupils. Innovative solutions have been developed and implemented which can improve learning and provide professionals with insight never seen before.

The management area counts with the innovative Student-Tracking-System features that allow schools to efficiently deploy their resources. Students now can easily receive personalized education.

The indication area was unexplored until recently, it is still under research and development but the results are already promising. It has made the indication process more accurate, fast and easy.

5 Model for Integrated and Unified ICTs on SNE

I analysed the current Dutch indication process for possible optimizations, resulting in a conceptual model for integrated and unified ICTs on SNE that offers several advantages to the whole system.

Among these advantages are: the optimization of the indication process itself; reassessment of previous indications; and use of pupil’s progress and adaptation information for future indications.

First, a state of the art description of this process is made in the next section, the following sections study how can this process be optimized in different areas.

5.1 The conceptual model

Looking at the current education model, not only in the Netherlands, but also in most developed countries, we can find 3 main areas of application of ICT: indication of appropriate education, learning and school management. The goal of this model is to bring value to the SNE system; it integrates innovation in each of those areas to come up with an optimized information cycle.

Annex A illustrates a detailed representation of the concept model and all of the incorporating elements, as well as their functions and influence on the education system.

The model starts by the indication process, which forwards pupils to the most appropriate schools; these pupils then learn using educational software,
this educational software monitors their performance; the school management software receives performance data from the educational software in order to maintain an accurate overview of each pupil's learning evolution; finally, the indication software fetches this data from the school management software and uses it for: reassessment of previous indications (follow up), and to give more educated suggestions in the next indications (based on the success and knowledge of previous ones).

As much iterations this cycle completes, as comprehensive the knowledge base of the indication software gets. With time, the indication software will profile pupils and assess the most appropriate education for them, based on similar cases in the past. Like so, the arbitration committee can make better decisions, and parents can find the most appropriate schools and resources for their child. If more pupils get the most appropriate education they can, it means that they will have the education that works best for them, and therefore, they will perform better.

5.2 Notes on ICT application areas

This model gathers the best practices of the three main areas of application of ICT, connecting and combining them for the maximum optimization of the whole education system.

With the use of advanced and innovative ICT in the Learning area, additional information can be inputted in systems of the Management and Indication area. This information cycle, which is presented by the model above, not only makes it possible for more informed decisions on pupils’ education careers, but also follows pupils throughout them.

6 Conclusions and Recommendations

This chapter closes the investigation with conclusions about the study, and recommendations for both the Netherlands and Portugal.

6.1 Netherlands

The Netherlands has an efficient system for SNE. A child with handicaps will have good support for his/her needs throughout the entire education career. The government has been quite active improving the inclusion of the handicapped. This resulted in the demand-based policy, which ensures the individ-
ual fulfilment of special needs for the best education possible, while including as many pupils as possible in regular schools for the best inclusion effect.

There are state of the art ICTs in almost every classroom, and the budget for their new acquisitions is appropriate. Adaptive educational software has shown promising properties, as the highly personalized education and the continuous monitoring. The direction should be of merging this type of software with the properties of immersive software, as the rich interface; which would create the ultimate educational software.

However, this well-organized system has some discrepancies. Even though state of the art ICT is available, teachers and schools still don’t bear in mind the national educational goals for education. Teachers often entertain pupils instead of teaching them, and schools purchase new ICTs without thinking of the extra educational value they actually need to acquire. The educational goals aren’t being given much importance, when the opposite should happen; the education is the result from the educational goals covered in the classroom.

SNE could greatly benefit from the standardization of the educational goals in the educational software market, meaning that the covered educational goals would be a main part of the software characteristics and schools would be required to cover all of them.

There are also advanced ICTs in the management field. Although not widely in use, software like the Student-Tracking-System brings powerful insight to the teachers on the evolution of the pupils. This is made possible by using information generated by the pupils while executing the educational software.

The IVO tools, which support the indication of special needs and schools for pupils with handicaps, also represent an important step in the use of ICT in the education system. Although it is used in a small scale it is a leap forward that can lead to series of changes that will shape the future education system.

Even though advanced and powerful ICTs are available to schools and teachers, the effect isn’t as prominent as expected. Professionals still need a big deal of training to successfully take advantage of all the features of these modern ICTs. This is an important issue particularly for the educational software, where many times teachers don’t know how to use it correctly, let alone teaching the pupils how to use it.

Fortunately there are some easier and cheaper ways of fighting the existent lack of training. Initiatives for knowledge-sharing, like the open database of lessons Wikiwijs.nl, support and help teachers improve their skills and keep updated. It is a cheap solution because it doesn’t require a complex technical
infrastructure. Knowledge practices like this are promising because they gather the collaborative power of the teachers, and make it available to all teachers as well.

The model for Integrative and Unified ICT on SNE would be a major advance in the education system structure. Such project has never been done in an education system, thus, representing a major risk, but also a remarkable technologic innovation.

6.2 Portugal

Unlike the Netherlands, the Portuguese SNE system is poorer as the budget constraints are higher. A pupil with handicaps won’t have much ICT support in Portugal. On top of this, the education system is transiting to the Inclusive Education policy. Although the goals of this policy are all positive, due to poor structure and reduced budget, it is having negative effects already. Regular schools don’t have conditions to receive pupils with special needs, neither these schools will have enough support.

ICTs are available in a very limited amount, mainly through CSR or charity. The few ICTs schools can get are highly valued by them, teachers hope they could have ICT support for teaching. As of management ICTs, they are not common at all; usually the school management software tools serve only for organizational purposes and don’t manage the pupils’ progress.

As Dutch teachers, Portuguese teachers also end up not paying due attention to the educational goals. Also, teachers don’t really have expertise on how to operate the few ICTs that are available, which is a problem originated by the lack of training.

A shortcut for the resolution of lack of training would be the implementation of knowledge-sharing practices. When presented with the Dutch ones, Portuguese teachers reacted enthusiastically; having a free online database class and inter-school knowledge-sharing communities would highly increase the skill set of the teachers. Teachers could refresh their teaching methods, get to learn how to use the ICTs available and get to know ICTs that schools can and should acquire.

Currently these practices are not common, but their implementation is easy and cheap, as they require only basic ICT. For better result, these knowledge-sharing practices should be implemented nation wide, and for that it should come from a governmental initiative.
6.3 General Conclusions

ICT has the capability to be the next major step in the education. It can solve difficult problems, increase productivity and effectiveness, and save costs.

ICT can improve the Learning area by teaching in a more effective and pleasant way, which is essential when dealing with pupils with special needs; ICT can also reduce the need for a high teacher-per-student ratio, making pupils more autonomous and saving costs.

Not only that, ICT can be paramount in the Management area as well, providing teachers with feedback that was not available before. Teachers can then direct their attention to the students who need it the most, at the right moment; avoiding students to get behind or forgotten in the classroom.

ICT also presents a major advancement in the Indication area. With the use of a continuously updated knowledge base, decisions on the pupils’ education career are even more educated and effective.

With all of these benefits, ICT makes it easier for pupils with special needs to attend regular schools, highly increasing the social inclusion of the handicapped ones.

However, it requires expertise and extensive knowledge to properly select and implement ICTs. Teachers and education professionals need training to adapt to these modern ICTs. It is also important to notice that, too much ICT is not the answer for a better education system. ICTs can only help if the education system has a strong foundation, without it they will only increase the complexity and decrease the efficiency of the system. Even with a good foundation for the application of ICTs, when a major introduction of ICTs takes place, there is the need for adjustment of the education practices used at that moment.

Knowledge-sharing practices, like online class databases and inter-school groups for sharing knowledge, are an important token from this investigation. They represent a cheap and effective alternative to training, and can keep the professionals up to date with the newest ICTs. This can also result in a cost reduction, because informed professionals can make better (budget) decisions related to the ICT.

The Model for Integrative and Unified ICTs on SNE can bring a new level of innovation to the education, optimizing and improving the system while taking advantage of existent resources. It can be applied to any education system that uses ICTs to support teaching and management, and offers a sustainable source of information to improve the whole education system.
Annex A

Conceptual model for Integrated and Unified ICTs on SNE
Bibliography


