

# Information and Communication Technologies (ICT) for Teaching Deaf in an Inclusive School Context

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**Abstract** This article reports on the conclusions drawn from a study conducted on the relationship between the elements of the ICT trinomial, social status, and acquisition of sign language in an inclusive environment. Through this article, we have explored the educational inequalities that exist between deaf learners in terms of the use of technologies (computer and internet ...). These stem from their social status as a determining variable in academic success. The data were collected through a survey that reached 25 deaf learners from different backgrounds. In the case of deaf beginners, the use of ICT not only allows access to knowledge but also to the initial learning of sign language as a communication tool. The collected data were analyzed using frequency, mean, and test distributions. The results of the study confirmed significant differences between deaf learners and also the importance of the computer tool in the acquisition of sign language inside and outside the classroom. This contribution could be an important reference to understand how social inequalities influence educational inequalities by also confirming Bourdieu's theory.

**Keywords** ICT, Inclusive, Acquisition, Learning, Sign Language, Social Status

## 1. Introduction

Inclusive education is seen as "a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures, and

communities, and reducing exclusion from education and from within education [1]. ICT is a goldmine for inclusive education, they offer a rich framework of knowledge, ranging from communication, illustration, animation to the source of information, where all learners with or without disabilities can enjoy and rejuvenate. In an inclusive classroom, the computer tool allows students with disabilities to develop their cognitive, psychomotor, emotional, and interaction potential [2].

For the deaf, the use of ICT is a real opportunity since their mode of transmission and receiving information passes through the eye and hand (i.e., if Sign Language is used in addition to, or instead of speech.) [3], a visual learning substitute for hearing and speech. This use of ICT remains unfavorable and inaccessible for the underprivileged deaf and remote and/or unconnected rural schools [4, 5].

In this regard, could the use of ICT facilitate the success of the deaf in an inclusive context? Is there a relationship between the acquisition of sign language and the social status of deaf learners?

Through our article, we will first look at the contribution of ICT in an inclusive school environment, and then we will explore the relationship between the elements of the ICT/social status and acquisition of sign language.

## 2. Inclusive Education Framework

In Morocco, the education of children with disabilities

has gone through several stages and experiences. The Moroccan education system has, in fact, integrated children with disabilities into the school sphere under the International Convention on the Rights of Persons with Disabilities, ratified on April 8, 2009. This integration first went through special education in centers specialized before appearing at the level of school integration classes (CLIS) in ordinary settings.

This latest integration approach proposes to break with the old classic and traditional approach marred by isolation and segregation of children with disabilities by allowing them to come closer to the "normal" school environment [6].

Field observations, however, allow us to predict and hope for better schooling for these children through a more ambitious approach in terms of the objectives to be achieved and daring of the risks to be taken. Children with disabilities seem, in fact, willing to open up more to their environment as long as it creates favorable conditions for them [7].

We have also been witnessing, in recent years, the expansion of a new approach called "Inclusive Education", based on the "law" and implementation in universal education systems. This new inclusive approach, allowing children with disabilities to be educated side by side with their peers in common classes with the same school curriculum. It also requires more effective management of cultural, social, and psychological diversity created by the complexity of the classroom situation.

This inclusive approach calls on the school to adapt to the specific needs of children with disabilities and not to remain in denial of disability and its specificities (educational needs / specific needs) as a component of diversity, something that will allow them to acquire knowledge, socialize and develop, far from any discrimination.

If the interest of the approach seems to be obvious, given its design and its operating model, the success of its implementation remains promising if resources and organizational and sometimes structural transformations are invested.

This new educational model, inspired by school integration, appeared at the beginning of the 1990s as a response to an innovative and ambitious vision called "inclusive education". This draws its foundation from an abundant and highly diverse international body of jurisprudence. For example [8]:

- 1948: Universal Declaration of Human Rights, Ensure the rights to free and compulsory elementary education for all children.
- 1989: United Nations Convention on the Rights of the Child, Ensure the right of all children to receive an education without discrimination, whatever the reason.
- 1990: The World Declaration on Education for All (Jomtien Declaration, Thailand).

- 1993: United Nations Universal Rules for the Equalization of Opportunities for Persons with Disabilities: Rule 6 not only states the equal rights to education of all children, youth, and adults with disabilities but also states that education should be provided "within an integrated framework" and "within the framework of ordinary educational structures".
- 1994: Salamanca Declaration and Framework for Action on Specific Educational Needs.
- 1996: Charter of Luxembourg (non-discrimination and the promotion of diversity).
- 2000: Framework for Action of the World Education Forum, Dakar, Education For All (EFA) Goals + Millennium Development Goals (MDGs), Ensure that all children have access to and follow up to "complete free and compulsory primary education by 2015. Focus on marginalized groups and girls.
- 2001: EFA flagship program devoted to the right to education of children with disabilities: towards inclusion.
- 2006: Convention on the Rights of Persons with Disabilities, promoting the rights of persons with disabilities and the integration of disability into development.
- 2014: Ongoing negotiations on the post-2015 development framework (Sustainable Development Goals) with a focus on inclusive quality education.

Under the motto: "it is time to stop talking about school integration because it is not conceivable that an individual needs to integrate the national community except to be a foreigner<sup>10</sup>", inclusive education is now defined as being "as a process of taking into account the diverse needs of all learners and responding to them through increasing participation in learning, cultures, and communities, and reducing the exclusion that manifests in education. It presupposes the transformation and modification of content, approaches, structures, and strategies, with a common vision that includes all children of the age group concerned and the conviction that it is the responsibility of the general education system to educate all children"[9].

From this exhaustive definition, we can identify the following guiding ideas:

- The term "process" refers to temporality, a dynamic with a beginning, an unfolding and an objective,
- The "diversity of everyone's needs" which refers to the section of special educational needs, of which the idea of personalizing school paths is very obvious,
- The notion of "participation" refers to the CIF through the concepts of limitation of activity and restriction of participation,
- The conditions for a real inclusive school as they are stated: "change and adapt the contents, approaches, structures, and strategies".

- Finally, the values underlying this definition: "the ordinary education system has to educate all children".

From the above, the figure 1 below summarizes the main characteristics of inclusive education [10]

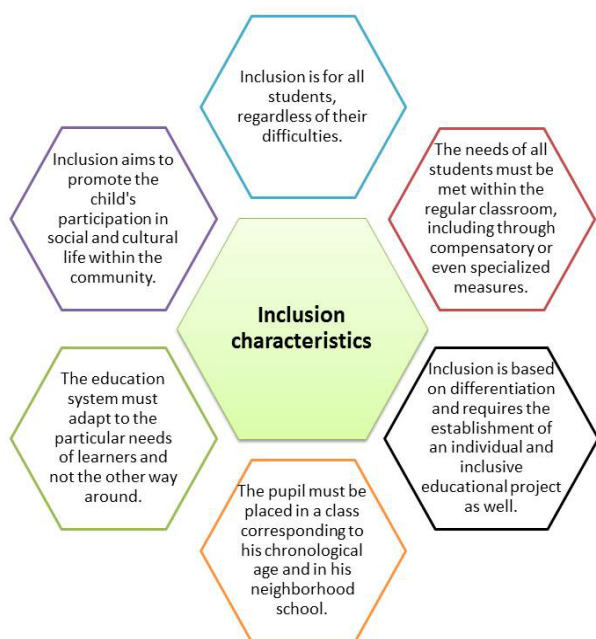


Figure 1. Characteristics of inclusive education

### 3. The Contribution of ICT to an Inclusive School Setting

From an inclusive perspective, diversity is seen as normal. From an inclusive perspective, diversity is seen as normal. In this perspective, the heterogeneity of so-called normal children and that of children with disabilities constitutes a melting pot of varied and complex profiles. Faced with this burdensome reality, the Moroccan school system is called upon to meet all the needs of learners without exception or discrimination.

Taking into account the specificity of the inclusive classroom is a major challenge that requires a significant didactic and pedagogical combination beneficial to all students. To do this, and except for known didactic principles such as flexibility, adaptation, and progression, teachers should reflect on appropriate pedagogical approaches, methods, and practices such as Pedagogical differentiation, individualized pedagogical project, the role of, co-teaching, compensatory strategies, and on the remarkable contribution of ICT in the pedagogical scenario.

The organization and management of an inclusive classroom require a didactic and pedagogical combination that benefits all students by promoting their development, both social and cognitive. To do this, and except for

known didactic principles such as flexibility, adaptation, and progression, teachers should arm themselves with adequate and useful pedagogical approaches and practices for such inclusive classes [11].

Consequently, the ICT tool remains a key element in the acquisition of knowledge alongside approaches deemed to be effective such as educational differentiation, personalized educational project, and co-teaching.

With this in mind, ICT fulfils this major role and offers this opportunity to work on texts, sounds, images, and their combinations [12]. Besides, the ICT, through their diverse and powerful tools:

- Encourage creativity and promote student understanding and expression through interactions and collaborative work between hearing and deaf peers [13];
- Strengthen communicative, collaborative, social, and methodological approaches within the mixed group [14];
- Strengthen the membership of the inclusive group and promote diversity and deter discrimination and stigma;
- Promote motivation and autonomy in learning sign language [15];
- Offer technical, material, and pedagogical accessibility in terms of compensating for special educational needs and in the collective construction of course sequences or exercises 3.
- Boost scientific curiosity and develop the skills of each learner by advocating pedagogical differentiation [16].

### 4. ICTs in the Service of Sign Language

On the communication level, sign language is the only means for any exchange that does not use speech. This in all its parameters (mimicry, gestures, bodily expression ...) is also a means by which the deaf manage to come into contact with others. These technologies in an educational environment allow deaf children first enrolled to learn sign language correctly and to spare them the random or even primitive signs via video capsules, dictionaries, CD-ROMs, sign guides and get rid of their random and primitive signs[17]. Indeed, the process of acquiring sign language may benefit from the use of a computer (e.g., for drawing or photos, -signing, or writing) [18, 19]: by visualizing the photo or drawing accompanied by an exact configuration of the interpreter representing the sign and its writing. Then the learner moves on to memorization. This repetitive process will allow not only the acquisition of language skills and structures but also respect for the non-verbal mode of communication because it is about the linguistic unity of the Deaf and their identity and culture.

Also, ICT can effectively help to remove a certain ambiguity about abstract notions to be explained in early

childhood by converting them into concrete notions accessible through illustration into bubbles (concretizing verbs with the help of bubbles can facilitate comprehension in a deaf beginner: example the verb dream: it is an abstract verb but to simplify it we draw a bubble representing a child flying above the sleeping child) and expressive images on connected computers [20].

## 5. The ICTs /Social Status Report on Sign Language Acquisition

With the recent arrival of ICT in Moroccan schools (educational briefcases distributed by the Moroccan Ministry of Education (computers, Photo Bank, Pictograms, CD-ROM, Television, Sign Language Dictionaries - training organized by many non-governmental organizations on disability and the right to inclusive education such as USAID (USA), OVCI (Italy), the Wallonia Agency (Belgium), Moroccan educational landscape has been largely revolutionized [21] and the adoption of ICT has become almost an obligation.

Our exploration of the local context of Khemisset city (Morocco) involved five inclusive classes spread over five inclusive public institutions:

This table demonstrates the relationship between ICT and social status and their impact on the acquisition of sign language.

Only 28% of deaf students use out-of-school ICTs. This small percentage is explained by the social status deemed to be the determining criterion of educational inequality

and an essential factor for academic success. We find that the seven students come from relatively well educated and well-off backgrounds (at least, belonging to the middle class), which corroborates Bourdieu's idea on social reproduction, allows us to extend it to an even more specific population and confirms the results above.

In other words, with an important social status that includes:

- Parents educated and involved
- Computer equipment available (Computer, Tablet, Smartphone, etc.)
- Connecting to the internet available and fast
- Other means of comfort (private property-vehicle-standard of living...)

Learners from well-to-do backgrounds are progressing better and are more advanced in sign language and communication compared to their peers by investing much more time in out-of-class work and socio-cultural and family support, they have integrated into an inclusive context thanks to the contribution of the computer tool and interaction with peers, by developing immunization with the whole class: deaf and hearing, and by demonstrating cooperative behaviors[22]. On the other hand, those from disadvantaged backgrounds work less at home and are content only with what teachers teach as courses without the possibility of extension and enrichment outside. This difference in opportunity translates into a difference in excellence and exposes students from lower socioeconomic status homes to academic failure.

**Table 1.** The impact of social status on school success

Inclusive establishments	Number of deaf students	ICT users outside the facility	Father's social status
Ali Ibn Abi taleb	5	0	.....
Charif Idrissi	8	3	Teacher
			Finance Framework
			Ministry of Education Framework
G/S Takana/sidi Allal Bahraoui	6	2	Senior official
			Executive of the Ministry of the Interior
G/S Hassan youssi	1	0	.....
Collège Mly Smail	5	2	Army officer
			Executive of the Ministry of the Interior
	25	7	.....

## 6. Conclusions

The use of ICT, such as computers, the Internet, and other emerging technologies, has become a necessity in inclusive schools. Like ordinary learners, deaf learners use the computer tool to improve their linguistic and disciplinary skills (writing, dictation, etc.) and also their thinking potential. Consequently, deaf people who do not have the means or come from precarious backgrounds do not have this chance to progress in matters of extension outside of school. In this sense, the state should ensure that all learners including the deaf have access to computers and the Internet through the support program (distribution of computers or tablets).

This study reported the ICT / social status and learning relationship among deaf students. There was no question of neglecting the impact of social status on the learning of the deaf in the Moroccan context. Consequently, we subsequently confirm the thesis of the French sociologist and philosopher Pierre Bourdieu who said that social inequalities generate inequalities in school.

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