مركز دراسات الدكتوراه: "اللغات والتراث والتهيئة المجالية"

تكوين الدكتوراه: اللغات والآداب والتواصل

محور: الدراسات الإنجليزية

مختبر: Discourse, Creativity and Society

Perception and Implication

# ICT INTEGRATION INTO THE MOROCCAN SECONDARY SCHOOL:
## AN IMPACT EVALUATION OF GENIE PROGRAMME
### A Dissertation
### Submitted in Partial Fulfillment for the Requirements of The Doctorate Degree in English Studies

**Submitted by:**
**Jalal ISMAILI**

**Supervised by:**
**Dr. El Houcine OUAZZANI IBRAHIMI**

**Date of defense: 11/07/2019**

**Members of the Jury:**

**Dr. Abdelhamid NFISSI, FLSH Sais Fez**            (Chairperson)

**Dr. Youssef BEN ABDERRAZIK, ENCG Fez**            (Member)

**Dr. Azzedine Khaloufi, FLSH Meknes**              (Member)

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**Academic Year
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*To the ones who enlighten my life…the source of my inspiration and aspiration… my beloved partners of every success and triumph…Meryeme, Jannat and the one yet to come.*

*Jalal, February 2019*

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مقتضب


إدماج تكنولوجيا الإعلام والاتصـال في السلك الثانوي بالمغرب:

تقييم أثر برنامج جيني


منذ انطلاقته عام 2006، فسح برنامج جيني المجال للحواسيب والمساليط و السبورات التفاعلية و القاعات متعددة الوسائط كي تقتحم العديد من المدارس العمومية و عمل على إضافة البعد التواصلي لعملية التدريس المدعومة بالتكنولوجيا. عمل البرنامج أيضا على تأهيل الموارد البشرية كي تصبح أكثر تجاوبا داخل بيئة عمل مدعومة بالتكنولوجيا عن طريق بعض الورشات والمساقات الهائلة المفتوحة عبر الإنترنت (MOOCs). رغم ذلك وفي ظل غياب أي دراسة لعائد الاستثمار أو دراسات تقييم الأثر، فإن البرنامج أثار جدلا كبيرا وانتقادات من طرف باحثين و مدرسين و لجان الافتحاص. يرمي هذا المشروع البحثي إلى دراسة أثر برنامج جيني على المدرسين و التلاميذ في المستوى الثانوي و الإعدادي وأيضا بعض المدارس العمومية باستخدام نموذج معدل لتقييم الأثر مكون من ست مستويات و الذي يدرس برنامج جيني من حيث السياق ورد الفعل و التعلمات و السلوكات والدعم التنظيمي و المخرَجات. يستند هذا النموذج إلى نماذج مشهورة و موثوقة للتقييم قدمها كل من كيركباتريك (Kirkpatrick) عام 1959 و ستافلبيم (Stufflebeam) عام 1971 و غاسكي (Guskey) عام 2000. استفادت عمليتا استخراج البيانات والتحليل من المقاربتين الكمية والنوعية مع تركيز أكبر على مقاربة النوع. بعد تحليل الاستبيانات والحوارات والوثائق ذات الصلة، نخلص إلى أن هذا البرنامج الذي يعتبر رائدا في إدماج تكنولوجيا الإعلام و الاتصال والذي استفاد من ميزانية ضخمة تتعدى 3 ملايير درهم (حوالي 300 مليون دولار أمريكي) بين سنتي 2006 و 2015 هو برنامج واعد لكنه فشل في الاضطلاع بمهمة إقحام المدرسة المغربية في المجتمع المعلوماتي كما تنشده الوزارة و الحكومة المغربية، حيث تعاني المحاور الاجرائية الأربعة للبرنامج (البنية التحتية و التدريب و الموارد الرقمية و تطوير الاستعمال) من عقبات عويصة تعيق تحقيق أهداف برنامج جيني في مراحل تنفيذه الثلاث، و حتما سوف تقف عقبة أمام تحقيق رؤية 2030 للوزارة. الفوضوية والرؤية المحدودة وضعف القيادة واللاتواقت كانت من أكثر العبارات تكرارا من طرف المشاركين في البحث والتي استعملت في توصيف عملية تنفيذ العديد من مشاريع جيني. ولأن الدراسة -التي نبتغي لها أن تكون بناءة- تتبنى استراتيجية عمودية تصاعدية فإن ردود فعل المشاركين (التلاميذ و المدرسين ورؤساء المؤسسات

التعليمية و المكونين) قد تم توظيفها في صياغة توصيات استدراكية لصناع القرار والقيمين على هذا البرنامج بصفتهم معنيين بالتجاوب مع تطلعاتهم في هذا الشأن.

# Abstract

15 years ago, the term Instructional Technology (IT) in the Moroccan public schools used to refer to mere audio-visual aids as access to high-end technology back then, namely computers, was not widely affordable. Since its inauguration in 2006, GENIE has made way for computers, video projectors, interactive whiteboards and multimedia rooms into many public schools, and has worked to add the communicative dimension to the process of technology-assisted teaching. The programme also worked on qualifying human resources to be more responsive within the new ICT enriched environment by means of occasional workshops and MOOCs. Still, in the absence of return on investment studies or impact evaluations, the programme stirred long controversy and provoked a lot of criticism by scholars, educators and auditing committees. This research project aims to study the impact of GENIE on teachers, middle and high school students and some public secondary schools using a customised six-level impact evaluation model that examines GENIE in terms of context, reaction, learning, behaviour, organisational support and outcomes. The model is based on the renowned impact evaluation models conceived by Kirkpatrick (1959), Stufflebeam (1971) and Guskey (2000). The process of data mining and analysis took advantage of both quantitative and qualitative approaches, with more emphasis on the second. The analysis of the questionnaires, interviews and related documents lead to the conclusion that the flagship ICT integration programme, in which the ministry of education invested a colossal budget that exceeds 3 Billion Moroccan Dirhams (300 million $US) between 2006 and 2015, is a promising one; however, it falls short of delivering its promise of engaging the Moroccan school into the information society as aspired to by the ministry and the government. The

programme's 4 axes of operation (infrastructure, training, digital resources and development of use) endure serious impediments that disturb the attainment of the programme's objectives throughout all GENIE's three phases of execution and will certainly hinder the realisation of the ministry's 2030 vision. Anarchy, limited vision, weak governance and asynchrony were the most recurrent descriptions used to describe the realisation of many GENIE projects according to the surveyed participants. Because the study, which we seek to be constructive, adopts a bottom-up strategy, reactions of participants (students, teachers, headmasters and coaches) were used to help formulate remedial recommendations for decision makers and stakeholders being concerned with responding to aspirations in this regard.

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# Chapter I

# General Introduction

## 1.1. Background

Instructional Technologies (IT) have revolutionised the process of teaching in different ways. Mastery of educational technologies available is such an indispensable requirement that raises a teacher's profile and is a substantial criterion to hire one. Accordingly, technology, as a pedagogical tool, is a motivation catalyst for both students and teachers to digitalise their teaching/learning process without necessarily being academically trained or aware why, when and how it could be used (Davies, 2011). Teaching with technology academically, rather, is not about making the process of learning easier, but more meaningful, challenging, interesting and foremost communicative (Haydn, 2014).

With the introduction of computers, internet, mobile phones, tablets and other communication devices, the interest of scholars has shifted towards Information and Communication Technologies (ICTs) as potential substitutes for IT tools driven by the communicative, competency and project-based approaches (Brown and Green, 2009). In order to approximate this global ever-evolving field of research, the Moroccan ministry of education launched GENIE programme (Generalisation of Information and Communication Technologies in Education) in 2006 to establish a nationwide strategy that systematises the abrupt occasional initiatives by teachers and voluntary associations whose effectiveness remained, for a while, questionable and more intuitive.

Like any other educational programme, it is essential to place GENIE under a thorough evaluation to determine its strengths and failures. "*When the evaluation is done, we can hope that the results are positive and gratifying, both for those responsible for the programme and for upper-level managers who will make decisions based on their evaluation of the programme*" (Kirkpatrick, 2006, p. 3). To date, the

programme has been operational for twelve years, which we believe is sufficient to make it subject to examination and criticism from a pedagogical perspective. The present study investigates factors of success and failure from a bottom-up perspective relying heavily on feedback from teachers and students. The study will also shed light on similar experiences and programmes overseas in secondary and higher education that should help formulate a better understanding of the programme's potentials and flaws.

## 1.2. Problem Statement:

The ministry of national education in Morocco celebrates GENIE as the most elaborate collaborative ICT programme in which the government, and its pedagogical and technical partners, invested a colossal budget exceeding 3 billion MAD between 2006 and 2013 over 2 phases 2006/2008, 2009/2013 (Ministry of Education, 2015), not to mention the deployment of a considerable amount of human resources. To date, the sweeping majority of available studies conducted by the ministry of education, interested bodies and scholars focus on the technical side of the programme with some sort of quantitative logic. These studies, such as the ones conducted by Messaoudi (2012), Hamse (2015), GENIE (2012), GENIE (2015) and GENIE (2016), that are close to balance sheets, focus on coverage and training rates rather than answering the most basic primitive question: What difference did the programme make on our pedagogical system?

According to Nachit et al. (2013), the majority of Moroccan Math teachers, for instance, use ICT for non-educational purposes due to several reasons including the lack of adequate training. Another study concluded that although some teachers benefited from a GENIE training course, they do not use ICT in the classroom by reason of lacking motivation (Alj and Benjelloun, 2013). It is also noted that the

growing heavy attachment of students to ICTs to produce presentations, research papers and prepare for exams does not translate into an enormous improvement of the students' outcomes, nor does it improve their critical thinking skills and analysis (Greenfield, 2014).

The ministry never conducted a thorough impact assessment of the programme that was initially supposed to last only three years to end up taking over a decade. Even the decision of programme protraction was based on perfunctory studies lacking the academic background and often neglect the direct stakeholders concerned with the process of teaching and learning; namely the teacher and the student. These "studies" examined, foremost, whether the equipment and training are sufficient without bothering about measuring their effectiveness and appropriateness.

## 1.3. Purpose and Significance of the study

The present study aims at examining factors that contribute to forging the Moroccan policy relevant to the integration of ICT in Moroccan schools. It aims at assessing the pedagogical outcomes of the investment placed on ICT projects, and GENIE in particular, to promote the transition towards effective learning a well-established information society. On the grounds that the study is purely academic and cannot be considered an audit in any shape or form, it does not wade into the financial provisions of the programme and the mechanisms of spending the allocations. The study will try, however, to assess the extent to which GENIE aligns with the vision of the country and the strategy of the ministry. Based on the generated data, the study provides recommendations to stakeholders and involved parties that might be interested in taking into account the reaction of first-line concerned parties.

The significance of the study resides in the fact that it provides an insight generated mainly from directly influenced parties represented by 249 participant

teachers and 304 students whose reactions and views are often not given priority ahead of the ministerial projects. Unlike other internal auto evaluations conducted by GENIE directorate, our study enjoyed a higher amount of autonomy to draft an independent, yet academic, appraisal that cites successes as well as failures with no reservations or constraints that may characterise insider evaluations. Equally, the study provides recommendations to the ministry and GENIE directorate that may, hopefully, render the programme, throughout its 2015-2030 vision, more potent and fruit-bearing.

**1.4. Research Questions:**

The questions used in the questionnaires, interviews and indexed mini quiz provide insight into precise pieces of information that bear a lot of specificity. The answers received along with the analysis of key GENIE documents and reports would help to draw a bigger image about the programme's triumphs and failures and to provide answers to six major research questions.

Q: Does the programme meet the strategic trends of the country relevant to Information and Communication Technology?

Q: Taking into account the substantial provisions of GENIE programme, what added value is brought about to the Moroccan educational system thanks to GENIE?

Q: Does GENIE operate in accordance with the initial road maps set by the ministry of education?

Q: What is the academic framework within which GENIE operates? If there is any, to what extent does the programme abide by it?

Q: What are the students' and teachers' attitudes towards GENIE?

Q: To what extent are the official bulletins and press communications released by GENIE directorate reflective of the reality in the classroom?

## 1.5. List of Acronyms

ALEF: Advancing Learning and Education for the Future

ASTD: American Society for Training and Development

AT: Assistive Technology

CAB: Change Advisory Board

CFS: Computers for Schools

CIs: Configuration Items

CIAO: Context, Interactions and Outcomes

CIPP: Context Input Process Product

CITI: Center of Information Technology Innovation

CM: Change Management

DET: Department of Educational Technology

CPD: Continuous Professional Development

D-Learning: Distance Learning

DWE: Digital Work Environments

E-Learning: Electronic Learning

FNS: First Nations SchoolNet

GENIE: Généralisation des technologies d'information et de communication

dans l'enseignement (Generalisation of Information and

Communication Technologies in Education)

ICT: Information and communication technology

ICTE: Information and communication technology for education

IT: Instructional Technology

KOICA: Korea International Cooperation Agency

MALL: Mobile Assisted Language Learning

MARWAN: Moroccan Academic and Research Wide Area Network

MKTC: Morocco-Korean ICT Training Centre

MSP: Maths, Science, Physics

M-Learning: Mobile Learning

MMR: Multimedia Room

MVC: Moroccan Virtual Campus

NCSTR: National Centre for Scientific and Technical Research

NCREL: North Central Regional Educational Laboratory

NCERE: National Centre for Educational Renewal and Experimentation

NOICTEU: National Observatory of ICTE Uses

NLDR: National Laboratory for Digital Resources

NRTA: National Regulatory Telecommunications Agency

OECD: Organisation for Economic Co-operation and Development

OS: Operating System

RAET: Regional Academy of Education and Training

RLBR: Reaction, Learning, Behaviour, Results

RMO: Regional Management Organisation

ROI: Return On Investment

SCETSR: Supreme Council for Education, Training and Scientific Research

SN: SchoolNet

UTSF: Universal Telecommunication Services Fund

## 1.6. Key Terms

### ICT

Information and Communication Technology (ICT), which is an extended
umbrella term that covers Information Technology (IT) and Communication

Technology, has no universal definition.  Definitions differ according to the issuing

institution, field of study and purpose of research. Media institutes, for instance, focus

on the news broadcasting and reception function of ICT, while educational settings

focus on ICT's learning/teaching roles. Some organisations focus on technicalities

such as the operating hardware and software, whereas others target the added value on

business. The definitions below illustrate for this

> *ICT is a broad term used to describe a transmission or idea exchange using*
>
> *equipment, tools, or networks. Examples of ICTs include: the Internet, cell*
>
> *phones, and personal digital assistants (PDA). (Level and Hoseth, 2008, p. 34)*
>
> *Any means of storing, retrieving and transferring/communicating information.*
>
> *(Shahtahmasebi, 2009, web)*
>
> *An umbrella term that includes any communication device or application,*
>
> *encompassing: radio, television, cellular phones, computer and network*
>
> *hardware and software, satellite systems and so on, as well as the various*
>
> *services and applications. (Yoon and Han, 2016, p. 795)*
>
> *An umbrella term that includes all technologies for the communication of*
>
> *information. It encompasses: any medium to record information (whether*
>
> *paper, pen, magnetic disk/ tape, optical disks - CD/DVD, flash memory etc.);*
>
> *and also technology for broadcasting information - radio, television; any*
>
> *technology for communicating through voice and sound or images- microphone,*
>
> *camera, loudspeaker, telephone to cellular phones. (Toyo, 2014, p. 853)*

The above listed definitions are extracted from different sources of divergent,

yet intertwined, academic fields of research to illustrate for areas of focus. The first

definition places its initial focus on ideas and the means by which they could be

dispatched or exchanged. The second definition is a rough one which focuses on ICT's different functions related to information processing without listing any of the involved devices. The third definition, on the other hand, focuses on the communicative function of ICTs and lists the most frequently used devices and gadgets. Most ICT related definitions go along the lines of this relatively comprehensive definition. The forth definition, in an attempt to achieve comprehensiveness, goes over primitive technology such as paper and pen and cutting-edge ones including cellular phones. The definition is exhaustive and demonstrates an embedded full awareness of the chronological evolution of ICT at the level of storage and broadcasting, yet these very same reasons make it outdated and unnecessarily naïve although it was coined in 2014.

Having listed these definitions, the author would like to specify that ICT in this study refers to all interactive electronic devices and gadgets used to communicate, share and store information. These tools could be used in different settings (formal and informal) for different purposes (professional and personal). This definition implies that all primitive technologies used traditionally to communicate and share information such as paper, newspaper and pen are excluded. Because radio and television fall within the linear one-way communication model that does not allow transaction between the involved parties, they are also excluded.

The term ICT is often confused with computers and computing activities (Noor-Ul-Amin, 2013). The misconception is basically due to the fact that most communication mechanisms, information processing and data storage were undertaken by computers for so long. Pelgrum and Law (2003) state that the term IT (Information Technology) began to replace 'computers' near the end of the 1980s to announce *"a shift of focus from computing technology to the capacity to store and*

*retrieve information"* (Pelgrum and Law, 2003). In 1992, when the e-mail became used for non-military purposes, ICT as a term emerged as a substitute term for IT.

### The digital divide

The digital divide according to the Organisation for Economic Co-operation and Development (OECD) is *"the gap between individuals, households, businesses and geographic areas at different socioeconomic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities"* (OECD, 2002, cited in Lorna et al., 2017, p. 192). The term digital divide co-occurs with economic exclusion and marginalisation of lagging communities due to their inability to compete in the global market.

The digital divide, according to Lallana et al. (2003), is measured in terms of public access to ICT. The key factors that measure the digital divide are Telephone Density, (also called teledensity), PC deployment and penetration, and finally number of internet users. It is observed, though, that Morocco ranks among the most privileged African and Arab countries in terms of teledensity, PC penetration and Internet coverage (NRTA, 2016); however, conducted interviews reveal that the flux of ICT gadgets in the market was not accompanied by a notable maturity of public use i.e. the evolution of ICT at the level of size, speed and storage did not radically enhance the layman technological core competence in Morocco. In technologically advanced communities, particularly in East Asia, individuals have achieved larger margins of autonomy, better access to information, dynamic marketing and even more involvement in political life (Lallana, 2003). These effects are relatively witnessed in Morocco but to a lesser extent.

### Change Management (CM) Approach

It is a collective term for all approaches that serve to prepare and support individuals, teams, and organisations in making organisational change. It includes methods that redirect or redefine the use of resources, business process, budget allocations, or other modes of operation that significantly change a company or organisation. (Singh and Kumar, 2017)

**Evaluation**

Evaluation as a process has been given different definitions depending on the field in which it is to take place and depending on the stakeholders involved.  The United States Joint Committee on Standards for Educational Evaluation defined evaluation as "*the systematic investigation of the worth or merit of an object*" (Stufflebeam, 1994). This rough definition, however, may seem loose, superficial and trivial enough to serve as a dictionary's definition. Moreover, not every evaluation attempts to examine the merit of an object; which is the case of descriptive, diagnostic or formative evaluations (Zinovieff and Rotem, 2008). Mary Thorpe (1988, p.5), however, provides a more exhaustive and pertinent definition for evaluation. *"Evaluation is the collection of analysis and interpretation of information about any aspect of a programme of education or training as part of a recognised process of judging its effectiveness, its efficiency and any other outcomes it may have."* Hereby, the definition implies that an evaluation should undergo systematic stages; from preliminary data collection to more elaborate steps such as interpretation and recommendations based on the generated outcomes. A similar but more inclusive interpretation of the term was provided by Steele (1970, p.9) as she defines evaluation as "*The systematic process of judging the worth, desirability, effectiveness, or adequacy of something according to definite criteria and purposes. The judgement is based upon a careful comparison of observation data with criteria standards.*"

The aforementioned definitions, and many others, help not just better understand what evaluation is, but also serve as guidelines for evaluators before they embark into the process itself. Each definition lists certain points and requirements to be taken into account such as being formal, systematic, purposeful, criteria-based, standard-based and eventually judgmental. Based on this conclusion we suggest that Evaluation is the aware formal and purposeful process of measuring and judging the worthiness of a training or tool based on certain valid criteria through comparisons, statistics, reviews etc.

**Programme Evaluation**

As we attempt to evaluate GENIE as an educational programme, it is inevitable to define programme evaluation as a sub-field of evaluation. Steele (1970, p. 9) defines the process as: *"judging (or a judgment as to) the worth or value of a programme. This judgment is formed by comparing evidence as to what the programme "is" with criteria as to what the programme "should be""*. The process, therefore, should make difference between the programme as it is for the time being, and what stakeholders and experts wish it would become. Evaluators by the end of the process should be capable of providing answers to many questions about the goals achieved, potentials of programme improvement and worthiness of costs (AEA - American Evaluation Association 2016)

Programme evaluation should incorporate three essential elements that are pivotal to determining the process's success or breakdown: Evidence, Criteria, and Judgement (Steele, 1970). Evidence is mostly related to the evaluator's academic background, experience and consultants involved in the process. The evaluation instruments deployed in collecting evidence, including technologies, can also influence the evaluation's outcomes for better or worse. Criteria are the reference

marks such as rules, standards and norms by which we consider something else acceptable, effective, successful … or not. At this level, Steele (1970) differentiates between two levels of criteria; macro-criteria and micro-criteria. Macro-criteria address major components of the programme being evaluated and, eventually, the entirety of the programme, while micro-criteria tackle sub-components of the programme. The outcomes of micro-criteria are determinant in the overall outcomes of the programme's macro-criteria and the final decision. Without coming to a judgement, which is the third key element, an evaluation loses its identity to become a mere description of the programme.

### The Moroccan Charter of Education

The charter was adopted in 1999 by the Moroccan ministry of national education in response to decentralisation calls to meet the regional local needs and challenges (Sassi et al., 2011). The Charter, which reflects the vision of the Moroccan government, targets the renewal of syllabi, textbooks and teacher training courses to make them fit for a new millennium. The charter also calls for making basic education available and compulsory for everyone everywhere in the country. Last but not least, the charter incarnates and enforces, for the first time, the constitution's vision with regard to the national and foreign languages that represent our identity and aspirations.

### E-learning Vs M-learning

While Electronic Learning (E-learning) is now viewed as an independent discipline on its own, Mobile Learning (M-learning) and Mobile Assisted Language Learning (MALL) are still making their way into academic research (Kukulska, 2008). The rapid maturity of this new field, however, seems to be promising due to the constant evolution of related technologies in terms of technical capabilities and

affordability. Kukulska (2008, p. 1) defines m-learning as "*Learning mediated via handheld devices and potentially available anytime, anywhere. Such learning may be formal may be informal*". We advocate that m-learning does not involve books, CDs, portable radio and DVD players. It rather deals with new technologies such as mobile phones/smartphones, tablets and PDAs. The previous definition implies that m-learning occurs when the device fulfils three conditions: Mobility by being handheld; Availability anytime anywhere all-day long; Adaptability to formal and informal learning environments.

Taxler (2005) in his attempt to define m-learning gadgets, excludes conventional ICT devices such as PCs and laptops. Taxler uses the word "tethered learning" as a key word that characterises e-learning model and differentiates it from m-learning. In other words, regardless of the potential technical capabilities of laptops and desktops, for instance, these technologies are rather used in formal learning contexts and do not fulfil the "anytime anywhere" principle. M-learning, on the other hand, and thanks to the technological leap, can now challenge all the distinct privileges of e-learning including usage in formal learning environments, offer much wider margin for peer interaction and run adaptable PC and laptop applications and software.

**Open Source Technology**

For a considerable period of time, starting from early 1990s when internet became largely accessible to mass internauts, operating systems, namely Windows and Apple, dominated the web industry. Unfortunately, these systems were unaffordable to people in many underdeveloped countries, resulting in the prevalence of non-genuine copies of these products. In response, developers from different parts of the world worked on providing free-of-charge platforms and programmes that can

be reviewed, redistributed, modified and used by other users through accessible source code (Deek, 2007). The source code, as roughly defined by Wikipedia, is any collection of computer instructions (possibly with comments) written using some human-readable computer language, usually as text i.e. it is the foundation platform which other developers use to realise alterations to improve and personalise the functionalities of a certain software or mobile gadget. The collaborative global spirit which once launched Linux, for instance, as a "fun experience", has succeeded to make this OS a leading one worldwide by reason of operating 98% of the world's super computers, smartphones and servers, according to Linux Foundation. Successful programmes such as Ubuntu, Android and Libre office are but a few examples of fierce competitors that made Microsoft under an obligation to make Windows 10 and some Windows Office services free of charge. Subsequently, open source technology is now capable of challenging conventional assistive technology and alleviating the hardship special needs people endure every day.

**Assistive Technology**

As described by Lancioni et al. (2012, p. 1), it refers to "*a variety of devices (and services related to their use) aimed at helping persons with disabilities and special education/rehabilitation needs to function better within their daily context and achieve a higher quality of life*". It refers to all technological devices that can help people with physical or cognitive impairments overcome the hardship they may get through when they need to depend on their own physical capabilities at school or in real life situations. The definition implies that the term involves hardware devices in addition to the operating software and applications used by people with special needs.

Chapter II

Historical Background: ICT in the Moroccan School and

GENIE Programme

As Information and Communication Technology is a core component for this paper, it is inevitable to address the educational technologies, their usage and their governing legislation set out by policy makers in Morocco. This section outlines the benefits of integrating ICT within the field of education (ICTE) as well as the evolution of GENIE over 12 years.

## 2.1. Potentials of ICT in Education

The digital divide as a reality makes the generalisation of ICTs a real challenge to under-developed and developing countries. It is a challenge that has far-reaching impact not only on education but also on economy and society leading to deeper and more grievous inequalities (Tinio, 2002). In its annual report of 1998, the World Bank forebodes these inequalities stating that:

> *[ICTs] greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others who live in the poorest countries, is their sense of isolation. (*World Bank, 1998)

20 years after the issue of the report, these de facto warnings as well as potentials proved to be true and have been reaffirmed in most ICT reports issued by UN affiliated organisations, international NGOs, and even governments. To meet the challenges of the 21st century, the US North Central Regional Educational Laboratory (2002) proposes 4 indispensable core skills: digital-age literacy, inventive thinking, effective communication, and effective communication.

Digital-Age Literacy: in the laboratory document, this skill is achievable through 9 sub-skills reduced by Tinio (2003) into 6 that include functional/basic

literacy, scientific literacy, technological literacy, information literacy, cultural literacy and global literacy. The Digital-Age Literacy as introduced requires a deployment of both micro and macro skills such as language learning, solving Math problems and understanding cultural differences.

Inventive Thinking: Tinio's version incorporates adaptability to complex situations, curiosity, creativity and risk taking (the NCREL add self-direction)

Higher Order thinking: it is listed in the NCREL version in the inventive thinking column, while Tinio dedicates a wholly independent section for it. The skill involves critical thinking and creative problem-solving sub-skills.

Effective Communication: includes teaming, collaboration, interpersonal skills, personal and social responsibility, and interactive communication.

High Productivity: Considered by Tinio an effective communication sub-skill, but listed by the NCREL as an independent major skill as it addresses planning, prioritising, managing and related business sub-skills.

The change at the level of deployed technologies enforced a change at the level of pedagogical standards and the learning environment. Traditional teaching approaches had to adapt to these pedagogical tools and reinforce new values to enhance the student's auto-learning mechanisms, problem solving competencies, and cultural and social values (McFarlane, 2015). Voogt and Pelgrum (2005) argue that today's students join schools and will eventually get job positions that do not even exist today, and have thus to develop *"lifelong learning competencies".* They proposed 5 learning aspects introduced to the 'information society' pedagogy that have been reconsidered in the traditional industrial society model.

*Active:* the learning process in the information society is more student-centred. The student determines his needs, activities and pace by himself. The whole class instruction is avertible as much as possible.

*Collaborative*: competition in the information society is less advisable as it does not promote solidarity and team work spirit. Students team up and collaborate in heterogeneous groups and are encouraged to support each other.

*Creative:* the learning outcomes in the information society are supposed to be innovative and generate new solutions to problems.

Integrative: learning becomes more appealing when it addresses issues from the student's real life. In this model, theory and practice should intertwine and teachers are to collaborate to build relations between subjects.

*Evaluative:* while summative evaluation does not contribute to improving the student's pre-requisites, diagnostic tests help both the teacher and the student decide where they are and what they want from the course. Also, the student should be involved in the assessment process (self and peer correction)

| Aspect | Less (pedagogy in an industrial society) | More (pedagogy in the information society) |
|---|---|---|
| **Active** | Activities prescribed by teacher | Activities determined by learners |
| | Whole class instruction | Small groups |
| | Little variation in activities | Many different activities |
| | Pace determined by the program | Pace determined by learners |
| **Collaborative** | Individual | Working in teams |
| | Homogeneous groups | Heterogeneous groups |
| | Everyone for him/herself | Supporting each other |
| **Creative** | Reproductive learning | Productive learning |
| | Apply known solutions to problems | Find new solutions to problems |
| **Integrative** | No link between theory and practice | Integrating theory and practice |
| | Separate subjects | Relations between subjects |
| | Discipline-based | Thematic |
| | Individual teachers | Teams of teachers |
| **Evaluative** | Teacher – directed | Student – directed |
| | Summative | Diagnostic |

Figure 1: Overview of pedagogy in the industrial versus the information society (in Voogt, Joke, and Hans Pelgrum. "ICT and curriculum change." *Human Technology: An Interdisciplinary Journal on Humans in ICT Environments* (2005).

In the information society, ICT plays a pivotal role in shaping a consistent pedagogy to meet the standards set by the society (Dede, 2000, as cited in Voogt and Pelgrum, 2005). Voogt and Pelgrum (2005) and many more scholars have made reference to the impact of ICT on acquiring complex cognitive skills including problem solving, science and languages.

All in all, ICTs have the potential to innovate, accelerate, enrich, and deepen skills within the classroom and beyond. They motivate and engage students within quasi-real-life experiences and practices. By doing so, teaching practices become strengthened and more meaningful (Davis and Tearle, 1999) (Lemke and Coughlin, 1998 as cited by Noor-Ul-Amin, 2013).

## 2.2. ICT and Assistive Technology for Special Needs Students:

Today, and with the growing interest in pedagogical and instructional technologies, researchers try to come up with solutions that can foster and maximise

the integration of special needs students within regular mixed classrooms (Ismaili and Ouazzani, 2017). Assistive Technology (AT) contributed to enhancing disabled people's lives to become synonymous with empowerment, hope and encouragement that place those students in front of "real-world" experiences (Akpan, 2013). According to some recent comprehensive studies, autonomy and self-determination were mentioned as the most important benefits of AT (Copley, 2004).

Thanks to the technological development during the 1970s and 1980s and the inclination of legislators all over the world to adopt policies that promote the use of ICTs for disabled people. Assistive Technology was introduced to schools in Canada and the USA and different parts of the world with Personal Computers (Hollier and Murray, 2006). It actually revolutionised the inclusion of students with certain impairments within the world of knowledge. Now the use of the term in academia is broader that it also covers material targeting gifted students with exceptional performance and high IQ scores. Although these students may not have any apparent issues that make them disabled or hinder their inclusion at school, their educational outperformance may result in undesirable feeling of annoying uniqueness and difference (Ismaili and Ouazzani, 2017). Consequently, they are also considered as special needs students qualified to benefit from AT programmes (Brody and Mills, 1997).

As there are different disabilities, AT areas of intervention include physical impairments such as visual impairments, mobility impairment, deafness and hard of hearing… and mental disabilities such as autism disorders, communication disorders and learning disabilities.

**2.3. ICT Limitations and Compromise**

In defiance of all the ICT advantages stated above, Rafi (2018) claims that ICT is not a revolution by itself; it is the utility, creativity and teacher's competence that lead to the revolution. He also adds that ICTs should not be seen as the only and unique «pedagogical salvation" for complicated educational issues. ICTs for him are but excellent teaching aids that cannot eliminate non-technological routine pedagogical practices and material, namely the textbook.

ICTs at this capacity are supposed to complement and « fertilise » the teaching process to make it stronger diversified and efficient; the use of which matters more than the material itself. ICTs should therefore be used interactively rather than passively, for they complete and enhance the quality of work and may by no means serve as a substitute to it.

The crucial, yet controversial question ICT experts are often asked is "will hard copy textbooks perish one day as a primary teaching/learning support for the teacher and the student?". Rafi (2018) lists a number of facts that, if put together, can answer the question:

- The lack of hard copy textbooks results in enormous difficulty for illiterate people, especially at the level of reading.

- A recent study on 16 case studies in Africa concluded that students with no textbooks endure reading issues, and end up having greater challenges in other school subjects.

- Unfortunately, books remain out of reach for many people due primarily to cost which is often 2 or 3 times more expensive than soft copies.

- Providing access to e-books will reduce their learning costs by 2 thirds.

- E-books are more convenient for students who have access to internet in terms of mobility and cost, but they are not a complete substitution.

Papert (1999) recapitulates in a few simple but insightful lines his philosophy of ICT.

*Technology serves as a Trojan horse all right, but in the real story of the Trojan horse, it wasn't the horse that was effective, it was the soldiers inside the horse. And the technology is only going to be effective in changing education if you put an army inside it which is determined to make that change once it gets through the barrier. (Papertn 1999, web).*

## 2.4. Digital Upheaval in Morocco:

The title of this section was inspired by the royal letter of His Majesty King Mohammed VI to the participants of the national Symposium E-Morocco in April 2001, where he called for a digital revolution that places the Moroccans in the very heart of a process that qualifies them to defy emerging social, digital and knowledge challenges (Rochdi, 2001). Enlightened by the royal road map, the Moroccan government set up a global strategy that addresses two levels: shifting from a slow-moving *economy* to a strongly evolving durable and job-productive one, and shifting from a socially and spatially inegalitarian *society* to a more solidary one. The technological mobilisation of sectors related to economy and society managed to realise a tangible rebound in telecommunication, media, utilities, foreign investments, illiteracy, employment, etc.

### 2.4.1. Moore's law

Gordon Moore, co-founder of Intel corporation, hypothesises that a microchip computational capability doubles every two years. This ever ongoing metamorphose is also marked by size reduction of these chips with no significant price increase

(Lallana, 2003). This rapid evolution of technologies at the level of performance and cost as well justifies the enormous growth of internet market in Morocco jumping from 200,856 users in 2000 making up around 0,7% of population to 20,068,556 users in 2016 making up 57,6% of population (Internetlivestats.com, 2017). The study involves only individuals who can access the Internet at home, via any device type and connection without counting professional users. Another study conducted by the National Regulatory Telecommunications Agency (NRTA) concluded that in 2015, 94,4% of Moroccans possess a mobile phone (including 54,7% smartphones) which is one of the highest rates in Africa. The same study revealed that 54,8% of Moroccans possess a tablet/laptop (NRTA, 2016).
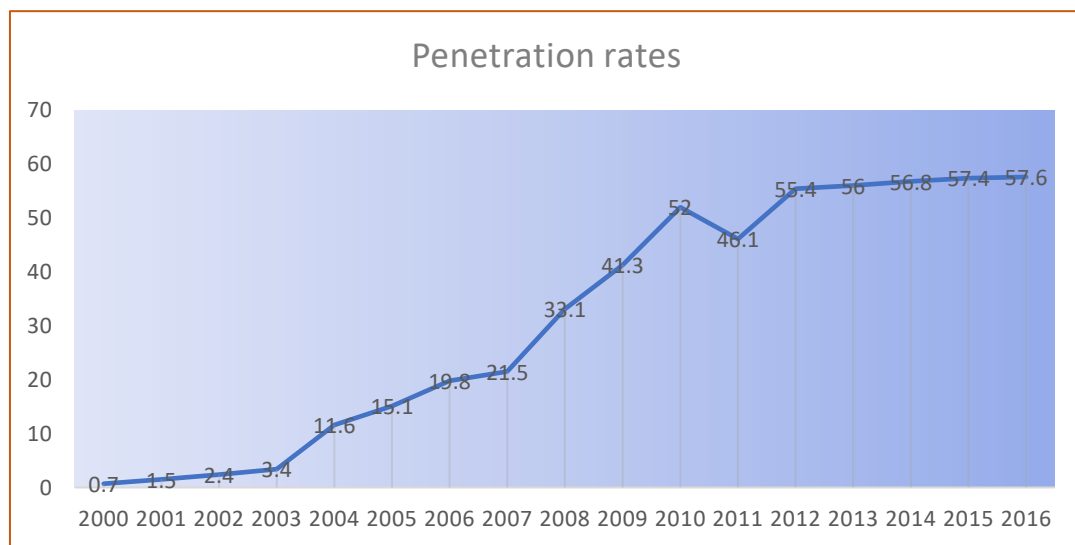


Figure 2: Evolution of Internet Users in Morocco

     The recorded surge in the number of users translates into an improvement of the services provided by national careers. This could be explained by Metcalfe's law which states that the value of telecommunications network grows proportionally with the number of users (Lallana, 2003). The more coverage and users a network has, the better communication, connection and social networking it provides. As the number of mobile users reached around 95% of Moroccans and almost 58% internet home

users, Morocco also ranked the leading Arab country in providing the fastest internet

followed by United Arab Emirates and Qatar respectively. The study that was

conducted by the specialised British firm Cable in August 08th 2017 placed Morocco

in the 79th position worldwide and 2nd in Africa.

| 2010 (Highest download speed) | | | 2017 (Highest download speed/video) | |
|---|---|---|---|---|
| 1. | KSA | 3.53 Mb/s | 1. **Morocco** | 3:53:40 |
| 2. | UAE | 2.74 Mb/s | 2. UAE | 4:05:39 |
| 3. | Qatar | 2.88 Mb/s | 3. Qatar | 4:23:14 |
| 4. | Kuwait | 2.68 Mb/s | 4. Tunisia | 4:52:23 |
| **5.** | **Morocco** | 2.03 Mb/s | 5. Bahrain | 5:27:18 |

Table 1: Internet speed in the Arab world[1]

### 2.4.2. E-Morocco Strategy

The strategy was officially launched in January 2005 to challenge factors of

underdevelopment at the level of five priority domains:

1- Education, training, scientific research and culture.

2- Administration and local counties.

3- Economy and Business

4- E-commerce

5- Generalisation of NICTs (New Information and Communication

Technologies) in social life.

The aforementioned domains had five major strategic objectives they aim at

achieving.

1- Generalisation of NICTs

2- Deployment of infrastructures

3- The acceleration of liberalisation and competition of network operators

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[1] Kassar, T. (2017). The top broadband speed countries in the Arab World | Interactive & Social Media news in the Middle East. [online] Interactiveme.com. Available at:
http://interactiveme.com/2010/04/the-top-broadband-speed-countries-in-the-arab-world/ [Accessed 23 Aug. 2017].

4- Redefining the role of the state

5- Providing the tools for the strategy

The E-Morocco vision was meant to stir the stagnant water by influencing every aspect of economic, educational, cultural and even social life in Morocco to be able to bridge the gap with the digital world community. To remain faithful to our scope of research, however, we decided not to address the strategies' work axes that are not directly related to education and academic research. This section lists a few examples of peripheral programmes E-Morocco has set up in an attempt to uphold ICT integration within educational settings. These programmes work to train present generations, prepare future ones and mobilise human resources.

**2.4.2.1 MARWAN project:**

Moroccan Academic and Research Wide Area Network (MARWAN)[2], is a non-profit digital network that is dedicated to schools, universities and research institutes. According to the programme's official portal, the network was launched in 1998 and managed to connect educational settings although it does not provide any statistics or evidence that support the claim. The allegation becomes questionable even more as the National Centre for Scientific and Technical Research (NCSTR) decides, under the umbrella of Urgency Plan in 2009, to launch a new edition of MARWAN under E-Morocco guidelines. The NCSTR solicited the Moroccan network operators, participating in a call for tenders, to set up a network that aligns with international standards and cutting-edge technologies to ensure a quality service

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2 MARWAN - Réseau informatique pour l'enseignement et la recherche. (n.d.). Retrieved January 28, 2016, from http://www.marwan.ma/

for students and scholars. Eventually, Meditel was the winning bidder to become the network operator, offering a broadband coverage going up to 100Mb/s.

At this point the programme's objectives were to:

- Insure new modes of interaction between educational institutes such as distance learning and video conferencing

- Develop scientific research thanks to a common database

- Place at the disposal of researchers a platform where they can exchange with international scholars via similar networks

- Grant students and researchers a wider access to ICTs by generalising media rooms in every Moroccan school and university

- Replace old fashioned modes of learning, exchange and publication by newer ICTs.

- Create new job opportunities for people working in the field. (Fellahi, 2017)

The programme operates by means of peripheral platforms such as Magrid and Educert to allow interconnexion of computing sites, access to services and data transfer.

**MaGrid:** It is a computing centre established by MARWAN division to offer a "*much needed demand*" for calculation and data storage dedicated to the Moroccan scientific community[3]. The platform is based on "Grid Computing" to set up a national computing grid "Magrid" deployed in 2006 offering 20 CPU and 10 Tb data storage. The database is to be shared by geographically dispersed users in Morocco to improve their cooperative and academic competencies. Only a month after it was launched, MaGrid was connected to EumedGrid allowing room for more cooperation and larger databases.

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[3] www.magrid.ma, accessed 10th July 2017

**Educert:** Formerly called Ma-cert, was launched in 2009 under the supervision of the National Centre for Scientific and Technical Research to insure the coordination, monitoring and prevention of security digital incidents within MARWAN network. The security coverage involves infrastructures and applications used by universities in collaboration with national and international computer emergency response teams.

### 2.4.2.2. Eumedis Project

It is a Euro-Mediterranean synergy project between the European Union and neighbours in the MENA and western Asian countries. Morocco joined the project as it addresses divergent areas of research including health, e-commerce, tourism, education and industry[4].

The project was founded on three core objectives:

- To establish a Euro-Mediterranean exchange network

- To interconnect think tanks in the region

- To launch regional pilot projects

### 2.4.2.3.The Moroccan Virtual Campus Project

The MVC is a sharing platform that clusters e-learning initiatives for higher education public institutes. It provides resources of pertinence to three categories of university students, namely BA and BS undergraduates, Professional BA and BS undergraduates and finally Master students. Ten university resource centres were

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4 "Morocco | EU Neighbours". Euneighbours.eu. N.p., 2017. Web. 29 Jan. 2017.

established to launch fifteen start-up projects of content development for higher education.

Once E-Morocco grew mature and drew the attention of stakeholders and interested bodies, it was given a boost in 2007 by the delegate ministry chargé of economic and general affairs with the introduction of E-Morocco 2010 vision. In a 127-page booklet, the ministry identifies the vision's achievements orientations and action plan for the following three years. In the education section, the bulletin details GENIE's accomplishments to date being the prominent project in education alongside MARWAN. The section cherishes the progress achieved in terms of ICT qualification for degree holders seeking job opportunities and the evolution of private education. In parallel, the document enshrines priority projects to be fulfilled by 2010 such as e-learning development, launching an educational web portal, deploying a mesh intranet for primary and secondary schools and constructing and updating digital resource banks.

### 2.4.2.4. Nafida Programme

This programme was launched in 2008, to encourage the adherents of Mohamed VI Foundation for the Promotion of Social Works of Education to use ICT within their classrooms. The programme, which was made to last 3 years, was endowed a budget of 430 million Dirhams. This programme was meant to complete GENIE by providing 100000 individuals with subsidised laptops, desktops, software and internet connection.

In October 2009 and under the royal patronage of his majesty King Mohammed VI, the ministry of industry, commerce and new technologies released

Maroc Numeric 2009-2013[5]. The vision, endowed with a budget of 5.2 billion Dirhams, defines issues, opportunities, and far-reaching strategies; much of which are consistent, particularly, with the educational aspect. The vision highlights the importance of ICT as a learning tool for younger generations worldwide. Additionally, it emphasises the government's initiative to ensure access to laptops and internet connection for engineering students in particular. As for elementary and secondary education, Maroc Numeric 2013 adheres to GENIE and NAFIDA as official ministerial programmes dedicated to ICT integration in education. Equally, the vision commits to promote access to ICT by:

- Providing access to internet and multimedia resources for public schools
- Providing access to internet and multimedia resources for engineering schools
- Subsidising teachers' equipment of computers and internet connections
- Subsidising engineering students' equipment of laptops and internet connection

## 2.5. GENIE Programme: Evolution of the Programme

### 2.5.1. GENIE I (2006-2009)

*Le programme GENIE est une déclinaison opérationnelle de la stratégie nationale de généralisation des Technologies de l'Information et de la Communication dans l'Education (TICE).* (NRTA.ma/missions, accessed July 18th 2017)

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5 : MAROC NUMERIC: Stratégie Nationale Pour La Société De L'Information Et L'Économie Numérique 2009 – 201. 1st ed. Ministère de l'Industrie, du Commerce, de l'Investissement et de l'Economie Numérique, 2009. Web. 5 Feb. 2017.

In its official presentation of GENIE programme, the NRTA refers to GENIE as "the operational version of the national strategy for the generalisation of Information and Communication Technologies in Education". The programme was officially launched in 2006 within a strategy targeting the generalisation of ICT for Moroccan students that represent, back then, 22% of the Moroccan population.

The potential programme finalities seemed promising and align with the ministry's 1999 vision to meet the challenges of educational reform. The 1999 ministerial report highlights that providing "access to ICT is one of the main pillars of this reform with regards to the National Charter of Education and Training. It is also part of the strategy seeking a Moroccan shift towards the information society. Concretely, the ministry of education has been involved in the implementation of the Project for the Generalisation of Multimedia – Internet" (Ministry of Education, 1999, translation).

> *L'accès à ces technologies est par conséquent un des leviers principaux de ladite réforme, en référence à la Charte Nationale d'Education et de Formation. Elle s'inscrit aussi dans le cadre de la stratégie mise en œuvre pour l'entrée du Maroc dans la société de l'information. Sur le plan concret, le MEN s'est engagé dans la mise en œuvre du "Projet de généralisation des moyens d'enseignement Multimédia – Internet.* (Ministry of Education, 1999, p. 40)

GENIE programme in this capacity is the implementation process and embodiment of a seven-objective plan declared by the ministry of education in 1999 that aims at:

- Placing multimedia potentials at the service of education and training
- Making the learning process more prompt, flexible and accessible

- Offering equal learning chances to students

- Reducing learning cost

- Expanding the sphere of continuous learning beneficiaries

- Enhancing performance and productivity by encouraging collaboration and teamwork

- Bridging the gap between teachers and encouraging educational exchange (Ministry of Education, 1999)

Meanwhile and due to many impediments, such as the inadequacy of necessary financial provisions, lack of a road map and the inexistence of the impulsive character, the vision was placed on a quasi-stagnant situation for around five years from 1999 through 2004. Within these five years, the ministry and the whole government became aware that investment in high technology does not line with some objectives, such as cost reduction, and that the effectiveness of any programme requires a focus on only a handful of realisable objectives; which clearly manifested in the official commencement of GENIE in 2006.

In its initial version (2006-2009), GENIE was granted a period of three years with three principal axes; infrastructure, training and digital resources:

**Infrastructure**: setting up multimedia environments with internet connection for students in partnership with international hardware and software companies. Each Regional Academy of Education and Training (RAET) places at the disposal of affiliated teachers 2 multimedia rooms for professional training.

**Training**: It was based on a waterfall approach. At the central unit in Rabat, a group of "Master Trainers" is selected and trained by experts. These Master Trainers will undertake the mission of coaching 4 regional coaches from each of the 16 RAETs.

These 4 coaches would, in return, give training to 2 or 3 school stuff who should eventually deliver the training to their co-workers.

**Digital resources**: also called content development aims at providing digital resources and establishing a national laboratory of digital resources and a national ICTE web portal.
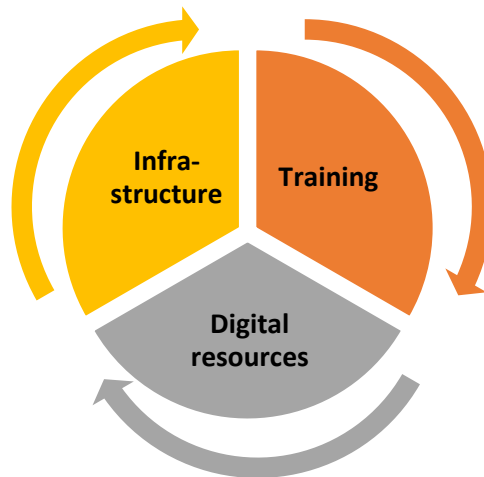


Figure 3: Initial Tridimensional Strategy (2006/2009)

The programme targeted 6.2 Million beneficiary students in primary, middle and high school; 230 000 teachers; 8604 schools and 13000 satellite schools. It was assigned a budget of 1038 Million Dirhams (more than 130 Million US$). The benefit hours for each level is different starting from 1h per week for each student in primary school, 2 hours at middle school and 3 hours at high school.

| | |
|---|---|
| **Beneficiary students** | **6 200 000 students** |
| **Beneficiary teachers** | **230 000** |
| **Beneficiary schools** | **8600/13000** |
| **Duration** | **3 Years (2006/2009)** |
| **Budget** | **1038 Million Dirhams (~130M US$)** |
| **Benefit Hours (per week)** | **1 primary / 2 middle school / 3 high school** |

Table 2: Programme's Tridimensional Objectives 2006/2009

In order to set the programme in motion, an agreement between the ministry of education represented by GENIE directorate and INTEL was signed in 2006 and 2007 based on project pedagogy model. This would allow teachers to acquire and sharpen ICT related competencies and enhance their day-to-day classroom practices via "Intel Teach to the Future" (Kabbaj & al., 2009). The implementation of the later programme was believed to potentially have a rewarding impact on the students' learning as well. As for the training component, GENIE incorporated 4 training modules:

- Common core module dedicated to teachers, headmasters and inspectors to initiate them into the programme's preliminaries including participants, responsibilities, communication, sensitisation, etc.

- Personal development module targeting the improvement of the trainee's prerequisites to become an effective user, integrator or even a developer

- Specific module for inspectors who would oversee and moderate the trainings

- Specific module for headmasters to improve their ICTE management skills.

Except the first module, each of the above modules is based on two modular training courses: A computer literacy module which includes operating systems, word processing, spreadsheet and calculation, and presentation/internet, while the second module is dedicated to the pedagogical use of ICT.

In parallel, other agreements were signed with other partners such as Microsoft and USAID's Advancing Learning and Education for the Future (ALEF) programme. The agreements were based on the analysis of real needs in the field to meet the requirements of multimedia rooms' management, ICT as a pedagogical tool and peer coaching (Kabbaj & al. 2009).

On the field, and due to a number of inhibiting factors, the programme barely achieved 25% of its target goals as the graph bellow illustrates and a renewal of the mandate was imperative.
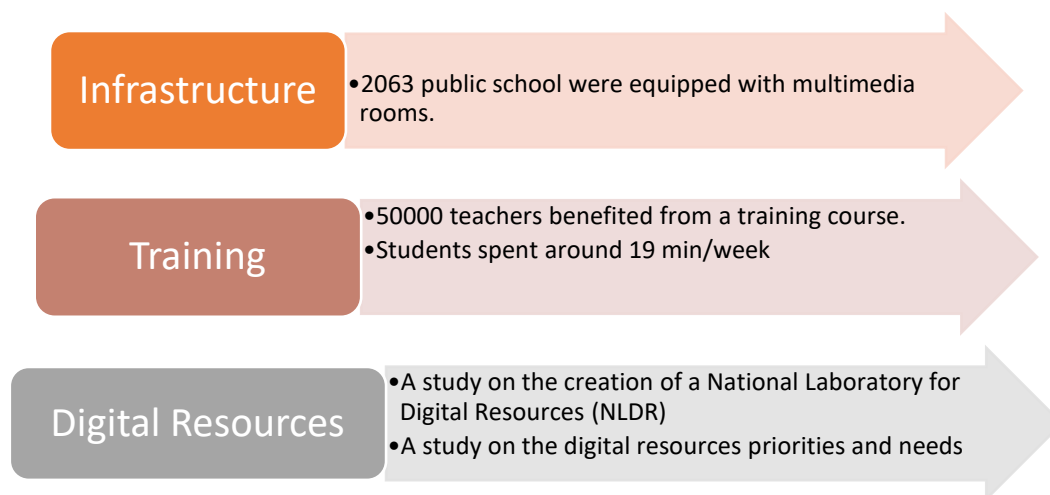


Figure 4: GENIE 1 achievements 2006/2009 (Messaoudi 2012)

## 2.5.2. GENIE II (2009-2013)

The firm willingness expressed by the ministry of education to disseminate and integrate ICTs in educational institutes is widely confronted by enormous obstacles, constraints and inhibiting challenges (Alj and Benjeloun, 2013). Therefore, and 2 years past the programme's inauguration, GENIE programme directorate, under the supervision of the NART, conceived a moratorium in 2008 reflecting on the importance of ICT integration into education. Studies (about the programme) revealed that raising awareness, communication, empowerment, reviewing and updating the training process in terms of logistics, coaching, supervision and content are necessary and essential for the improvement of GENIE (Kabbaj et al. 2009).

*En 2008, des études ont montré que la sensibilisation, la communication la responsabilisation, la révision et l'actualisation de la formation en termes de logistique, d'encadrement, d'accompagnement et de contenus sont nécessaires*

*et indispensables pour l'avancement du programme GENIE.* (Kabbaj et al. 2009)

The revisions and adjustments, that were elucidated by international reference guides such as the UNESCO reports and academic publishings on ICT, addressed the development of technological, pedagogical, mediatic and meta ICT competencies in relation to operational objectives, time and space management, communication, delivery of information, auto-learning, flexibility, adaptation, collaboration and innovation (Deschryver, 2000). The moratorium was an opportunity to formulate a new strategy to overcome GENIE I dysfunctions and flaws that have arisen between 2006 and 2009, to optimise ICT integration in the educational practice and *give new impetus* to the initial strategy (Abouhanifa et al., 2009, cited in Alj and Benjelloun, 2013).

GENIE II was particularly characterised by the introduction of a forth axis to be added to infrastructure, training and digital resources; that is of usage development. The new mission sets a number of priority objectives such as the acquisition of digital resources, launching an ICTE web portal, organising sensitisation campaigns and sharing workshops. It also investigates and tracks what the end users do with ICT (Ennda, 2010).
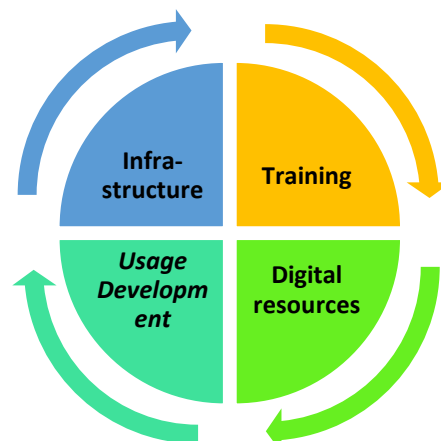
Figure 5: GENIE II Strategy (2009/2013)

2009 marks the year the Urgency Plan was issued after the alarming reports on the deteriorating condition of education in Morocco. GENIE directorate contribution project to the plan (E1P10) was entitled "Integration of ICT and Innovation in Learning" under the rubric of "Making Schooling Compulsory until the Age of 15" (Urgency Plan, 2009). The project sets five measures:

- Improving the control mechanism of GENIE

- Establishing an equipment strategy to integrate computers into the learning environment of students

- Establishing a training strategy tailored to local needs

- Accelerating the development of digital content

- Developing an effective *"change management strategy"*

Thanks to the urgent pressing nature of the Urgency Plan, all listed projects were endowed the necessary financial and logistic provisions to realise the following objectives:

| | | Objectives | Realisations |
|---|---|---|---|
| **Infrastructure** | Laptops/computers | 5950 | 119 |
| | Multimedia rooms | 3443 | 2335 |
| | Multimedia bag | 9260 | 7210 |
| | Interactive boards | 100 | 100 |
| | Internet connected schools | 9260 | 9260 |
| **Training** | Teachers and coaches | 209700 | 151558 |
| **Digital Resources** | Establishing an NLDR | Established in 2009 | |
| | Establishing ICT training centres | No data available | |
| | Acquisition of Digital Resources | 90% of DR acquired | |
| **Usage development** | Launching an ICTE web portal | www.Taalimtice.ma launched in 2010 | |
| | Sensitisation campaign and sharing workshops | 200 workshops | |

Table 3: GENIE's progress rates. The Court of Audit: Special Report No. 05/13 / CH IV, February 2014

In 2010, the Morocco-Korean ICT Training Centre (MKTC) was inaugurated in Rabat as a fruit of a partnership agreement signed between the Moroccan ministry of education and the Korea International Cooperation Agency (KOICA) earlier in 2008. The centre is a jointly funded by the KOICA, which invested 3 Million Dollars dedicated to the purchase of training apparatuses, and the ministry with 8 Million Dirhams in order to restore existing premises. In addition, the centre, which is run by executives who received a training in Korea, was equipped with cutting-edge technology in terms of training equipment, highspeed internet connection, multimedia production studio, amphitheatre and a web portal. This initiative comes straight after the agreement between the KOICA and Al Akhawayn University in February 2008 to set up the Centre for Information Technology Innovation (CITI) which promotes the integration of ICTs in public schools with particular focus on scientific subjects such as Maths, Science, Computer Science and Physics. The project lasted for 3 years and involved launching a web portal, providing material for teachers and students (videos, slides, lesson plans, educational games…), and was concluded with an evaluation of the whole process.

In terms of financial provisions, it is observed that very little information is available about how much is spent on GENIE 1 as well as the "total" cost of GENIE 2 resulting in wide concerns and suspicions of squandering public money raised by labour unions, journalists, politicians and even officials at the ministry of education (Bakouch, 2013). These concerns are even magnified by the fact that new funds are added to the project budget under the Urgency Plan in addition to other contributions made by the 16 regional academies.

### 2.5.3. Suspension of GENIE Trainings

With the coming of the former minister of education Mohamed Ouafa in 2012, and before GENIE II came to its foreseen closure in 2013, all in-service trainings were put on hold due to strong allegations of public money squandering. The decision lasted from January 2012 till October 2013 and affected GENIE trainings as well. His successor, Rachid Belmokhtar, was a bit reluctant to seize the suspension which seemed evasive and unjustified to the public opinion; therefore, the ministry had to issue a communication on the topic to announce that:

- The minister does not call for a complete shutdown of the project, but rather an "*assessment pause*" for GENIE achievements at the level of ICTE integration, appropriateness and learning improvement.

- The ministry has indeed started an "internal evaluation" for the current school year 2014/2015 similar to the one conducted in 2012, based on the teachers' basic-competency approach as identified by the UNESCO.

- GENIE had a positive impact on the system of education in Morocco, despite the undeniable lapses during the implementation process. (Ministry of Education, 2015)

- إن السيد وزير التربية الوطنية والتكوين المهني لم يتحدث خلال اجتماع لجنة مراقبة المالية العامة المنعقد يوم 06 أبريل 2015، عن وقف تطبيق برنامج "جيني"، **بل تحدث عن وقفة تقييمية لإنجازاته**، من أجل الوقوف على واقع سيرورة إدماج العدة الديداكتيكية الرقمية، وعلى مدى ملاءمة الموارد الرقمية ومساهمتها في تجويد التعلمات.

- إن الوزارة شرعت فعلا في إجراء تقويم داخلي برسم السنة الدراسية الحالية 2014- 2015 على غرار التقويم الداخلي الذي كانت قد أجرته سنة 2012، والذي اعتمد في مقاربته على الكفايات الأساسية للأساتذة التي حددتها منظمة اليونسكو.

- إن السيد الوزير أكد في نفس الاجتماع أن برنامج "جيني" كان له وقع إيجابي على المنظومة التربوية لا يمكن تجاهله بالرغم من التعثرات التي عرفتها إجراءات تنزيله.

Reference: From a letter to the Director of PJD Website. (2015, April 08).

### 2.5.4. GENIE III (Post 2015)

Within the Strategic Vision of Reform 2015/2030 launched by the Supreme Council for Education, Training and Scientific Research (SCETSR), particularly in the sixth lever, the council calls for the equipment of educational institutions with the necessary infrastructure, equipment, didactic material… and digital libraries... It also calls for the equipment of classrooms with audio-visual aids and ICTs (SCETSR, 2015). The vision has lifted the ban on GENIE and freed it from any fixed-term plans.

Starting from 2016, the programme has for the first time opened up on Open Source programmes thanks to the National Laboratory of Digital Resources (NLDR) and the Morocco-Korean Centre of ICTE Training (MKCT) by means of several projects

*GENIE Programme, …, has always worked to promote the production and use of Free Educational Software and Resources by means of several projects that support this national and international dynamic deemed essential to the development of the knowledge society. (GENIE 2016)* translation.

GENIE directorate goes further to acknowledge the benefits of Open-Source programmes, such as cost and appropriateness to serve as a unique resource of alternative solutions

*Several projects and initiatives contribute, in a relevant way, to supporting the national policy of generalisation of technology use by proposing, at very low cost and often gracefully, alternative solutions well adapted to the diversity of the situations of our educational system. (GENIE 2016)* translation.

The Morocco-Korean Centre of ICTE Training launched a series of training seminars and workshops such as "LIBRE Thursdays" "ICTE Meetings" and "Free Software Days", which represents a "*migration towards open standards and free*

*software and an operationalisation of Open Source Lab*" (GENIE, 2016). Open Source apps ranged between operating systems (UBUNTU), Content Management Systems (Moodle, Wordpress, Canvas, etc.) and e-learning platforms (MOOC, Scol@ire, ComPracTICE, etc.)

### 2.5.5. GENIE-SUP

It is GENIE's twin Project with the same background, vision and piloting department. The programme, which is funded by GENIE Universal Telecommunication Services Fund (UTSF), set a number of objectives including generalising the use of ICT in higher education, the deployment of Digital Work Environments (DWE) at universities and connecting 150 institutes to the internet via a dedicated WIFI network (Rafi, 2017). The Universities will retain the ownership of installed WIFI infrastructure, and the coverage is provided by one of three Moroccan network carriers.

GENIE Sup was accompanied by two projects:

Nafid@: funded by UTSF and managed by the social works foundation, allows teachers to benefit from a subsidised internet connection. 150.000 teachers benefited from the offer including university professors.

INJAZ: dedicated to higher education students and allows them to own a personal computer or a tablet with internet connection. According to Rafi, 130.000 university students managed to take advantage of the initiative making up 85% of registered students between 2009/2013 (Rafi, 2017).

It is observed that there is a marked deficiency of literature on GENIE SUP probably due to the following:

- A quantitative/qualitative evaluation of the worthiness of these programmes is still lacking

- Universities enjoy a wider autonomy to conclude deals and sign agreements with companies such as Microsoft and Intel, without any third-party mediation insured by the ministry. The computerisation process of Moroccan public schools is experiencing an undeniable development, but the use by teachers and their students of this computer and multimedia infrastructure is not uniform.

- Universities, as institutions, possess a relatively stronger infrastructure such as laboratories, research teams, technicians and experts who are capable of developing apps, launch web services and repair equipment in full independence.

Chapter III:

Theoretical Framework

Post the 2008 GENIE's moratorium and as a contribution to the 2009 Urgency Plan, GENIE directorate conceived a five-measure project entitled "Integration of ICT and Innovation in Learning" that would help reduce school drop-outs and make schooling compulsory until the age of 15. The project is intended to improve the control mechanism of GENIE, integrate ICT into teaching, enhance the training strategy to meet local needs, develop digital content and set up an effective "*change management*" (CM) strategy. In this part, more light is shed on the theory in order to examine the extent to which GENIE directorate adhered to the guidelines of the CM approach.

## 3.1. Change Management (CM) Approach

As the process of making change within a certain organisation requires the mobilisation of different factors, the CM approach involves different inter-disciplinary fields of study such as behaviourism, business administration and management, social sciences and Information and Communication Technology (Singh and Kumar, 2017*).* Mentioning Change Management in such an official document is not arbitrary given the fact that it is an ICT service management discipline. CM examines the defective strategies, projects, legislative texts, etc. that hinder the attainment of better results. It is meant to standardise and internalise the best practices, methods and techniques that would eventually render ICT equipment efficient and incident-free. Therefore, the change must meet the following requirements (WIKIPEDIA, 2017):

First, it has to be approved by the managing authority, also called the Change Advisory Board (CAB), which consists of specialists in different fields within the organisation whose mission is to evaluate, communicate and report about the change process. Second, it does not cause any harm or risk to the existing IT infrastructure,

including hardware, communications equipment and software, system software, documentation and procedures associated with the running, support and maintenance of live systems. Third, it results in a new status of one or more configuration items (CIs) that would help achieve a more efficient impact *to ensure all changes are assessed, approved, implemented and reviewed in a controlled manner* (International Organisation for Standardisation ISO 20000). Finally, and most importantly, there should be an added value after the change takes place as a reward for ICT use.

## 3.2. Change Management Models

Although CM approach is closely related to the realm of technology and communication, it was initiated in early 1950s by scholars who contributed to the enrichment of this discipline with their own CM models such as the behaviourist Kurt Lewin. Following, is a terse outline of some major models (Kritsonis, 2005):

**Lewin's Three-Step Change Theory:**

This model was introduced in 1951 by Kurt Lewis who was influenced by the trend of behaviourism. Like all behaviourist approaches, Lewin's model reinforces the action/reaction, stimulus/response equation. He believes that change within an organisation is likely to take place when the employee's efforts are pushed towards a desirable direction. Likewise, the attainment of a particular objective is conditioned by the fulfilment of particular arrangements. The change, according to Lewin, must go through a three-step process. As a first step, it is essential to unsettle the pre-existing conditions by "unfreezing" the status quo which provoked the need for change by increasing the driving forces away from the extant conditions, decreasing the restraining forces that stall the movement of the programme or institution, and finally promoting activities that spur the unfreezing process such as motivating employees, building trust, brainstorming solutions, etc. (Kritsonis, 2005). The second step in the

process is movement. Employees are on the move when they are persuaded to embrace new practices, ready to teamwork to realise new objectives and able to communicate their views with their leaders. Once the change takes place, Lewin proposes refreezing as a third step. If the change is not internalised, any change is subject to relapse due to the engrossing effect of old routine practices/behaviours. This step brings back a new "stabilising equilibrium" to the work environment.

**Lippitt's Phases of Change Theory**

In 1958 Lippitt collaboratively with Watson and Westley developed Lewin's model and introduced a seven-step theory

- Diagnosis of the problem

- Assessment of change motivation and potential

- Assessment of the change agent's readiness, motivations, resources, etc.

- Establishing the change plans and strategies

- Assigning the roles of change agents

- Maintaining the change through communication, feedback and coordination

- Terminating the help relationship when each member undertakes their roles competently.

Unlike the previous model, Lippitt's places much focus on the change agent being the dynamo of any change rather than the process itself. Lippitt also thinks that the change is likely to have a stronger stable effect when imitated by neighbouring systems and organisations to become a protocol or a new culture.

**Prochaska and DiClemente's Change Theory**

Prochaska and DiClemente also focus on the change agent but form a clinical psychanalytical perspective. Their change model is founded on their hypothetical perception of behaviour change which a person embraces. According to them, change

takes places through five stages: precontemplation, contemplation, preparation, action and maintenance
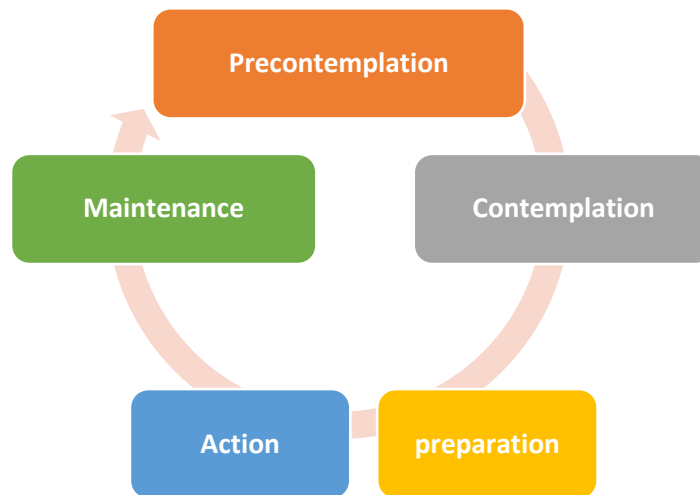


Figure 6: Prochaska and DiClemente's stages of change

- **Precontemplation**: is the condition where a person (or a patient) does not acknowledge the need to change and the existence of a problem that should be addressed. The individual is in denial and is resistant to any attempt to change their current "comfort zone"

- **Contemplation:** The individual at this stage becomes more resilient to acknowledge the existence of an issue that has to be changed.

- **Preparation:** characterised by the individual's readiness to engage in the change process that includes counselling, social support, problem solving…

- **Action:** the individual at this step is introduced to behaviour changing activities and becomes part of the change process.

- **Maintenance:** the newly acquired practices and behaviours are reinforced and internalised to become the individual's routine.

The model acknowledges the possibility of behavioural relapses and rejection of the new behaviour and suggests either going back one step or starting

over from the precontemplation step with supplementation of the undertaken measures.

### Social Cognitive Theory

This theory suggests that human behaviour changes as a consequence of environmental influences, personal factors, and attributes of the behaviour itself (Robbins, 2003, as cited in Kritsonis, 2005). According to the theory, an individual behaviour/performance depends on their self-efficacy; their ability to trust their innate capacity to perform particular actions. Thus, a person's social learning takes place when the individual's positive expectations are stronger than negative ones; when the instructions are clear, the opportunity to sharpen one's skills is abundant and there is a clear idea about the desired target behaviour.

### Reasoned Action and Planned Behaviour

According to the theory, an individual may not contribute to attaining a desired positive behaviour only if they had a positive attitude about it. Thus, the person's environment shapes their attention and engagement to realise the target behaviour (or change). *This includes the beliefs of their peers and what they believe the individual should do as well as the individual's motivation to comply with the opinions of their peers* (Kritsonis, 2005).

### John Kotter's 8-Step Model

In his 1995 book "Leading Change", John Kotter asserts that 70% of organisations fail to apply change due to missing the holistic approach of the process or relying heavily on passing on messages through internal communications and memos (Mourfield, 2014). Roughly speaking, the 8-step model could be summarised in:

- Acting with urgency (by Identifying and discussing crises, challenges and competitors)

- Developing the guiding coalition (by fostering team spirit and assigning tasks)

- Developing a change vision (by setting up strategies and plans)

- Communicating the change vision (by teaching new behaviours to the team)

- Empowering broad-based action (by removing obstacles, changing systems and promoting innovating ideas)

- Generating short-term wins (by recognising early gains and encouraging change)

- Consolidating gains and producing more change (by creating more productivity as soon as possible and clearing any resistance to change)

- Incorporating changes into the culture (by building awareness that the new behaviour change and generated success are interconnected and need to be sustained (Kotter, 1995, cited in Mourfield, 2014)

**Edwards Deming's Plan-Do-Check-Act Cycle**

The model was coined by W. Edwards Deming who is considered by many as the father of modern quality control. Edward's model consists of four major steps

Figure 7: W. Edwards Deming's Plan-Do-Check-Act (PDCA) Cycle

**Plan**: At this stage, the actions involved are investigations on the issues, understanding the need for change, and becoming aware of the change challenges and requirements.

**Do**: At this point, the change agents are to implement the improvement, collect and document the data, document problems and accumulate expertise (Gorenflo and Moran, 2010)

**Check/Study**: This phase involves the analysis of the progress made and the comparison of the realisation rates to the pre-defined objectives.

**Act**: once the planning, testing, and analysis of improvement is done, it is time to decide what to do next; adopt and standardise the performance when it leads to remarkable improvement; adapt and revise the strategy deployed when adjustments are required; or abandon the whole process if the changes made are useless or contradict with the desired results. Starting over, then, from the plan step is inescapable.

## 3.3. Criticism and Challenges of the CM process

Although these models and approaches may seem different, given that they stem from different approaches such as behaviourism, cognitivism and the communicative approach, they are all founded on common basic foundations; namely diagnosis of the problem, setting up a strategy, deploying the necessary tools and finally internalising the new changes as a new standardised culture. Singh and Kumar (2017) add that the risk of undermining the management of change jumps higher when:

- the process is overwhelmed by competing initiatives within the team

- the leadership is loose, and the communication is not effective

- the employees are not educated on the day-to-day added value of change

- there is no remedial strategy or a plan B in the event of initial strategy collapse

- there is no financial or moral reward that motivates groups and employees to accomplish their responsibilities and maintain their zealous performance.

On the other hand, Kim (2015) challenges the validity of most of these models for being more prescriptive, submerged with theoretical perceptions, and based on hypothetical phases. The process, then, often misses the empirical justification and experimental validation that can render the CM model more coherent, valid and innovative. When the execution board members fail to correlate the "preaching" of the CM model to their day-to-day work routine, they tend to be less engaged causing the process to break down midway. Kim also accentuates that when the change is a top-down model that does not engage employees in the formulation of plans, strategies, procedures …, they are likely to consider it as a forced change "*Therefore, members' decision is as important as the preceding organisational decision and should be*

*valued because they might respond negatively if they perceive that they are deprived of it*" (Eagly and Chaiken, 1993, cited in Kim, 2015).

As technology is in the heart of change management process, it often comes with technology related obstacles. Individuals are supposed to acquire and demonstrate technological skills and knowledge (Kearns, 2004). They may, however, develop undesirable reactions that are likely to diminish their productivity such as fear, anxiety and uncertainty in the form of resistance to the change (Trader-leigh, 2002, cited in Kearns, 2004). Kearns (2004) advocates that the resistance is natural as individuals are sceptical towards change for fear of redundancy, extra work, destabilisation effect, etc., in an instinctual protective reaction (Born, 1995 Kearns, 2004)

## 3.4. The Process of Evaluation

> *The most important purpose of programme evaluation* is *not to prove but to improve (*Stufflebeam, 1993, p. 151*)*

To maintain its credibility and liability, every pedagogical programme must naturally be subject to evaluation, examination, criticism and eventually supplementation or suspension. The process of evaluation helps scholars ascertain and verify the productivity of the educational practice to keeps it free from abruptness and improvisation.

### 3.4.1. Types of evaluation

Prior to 1960s, evaluation of educational programmes aimed at pinpointing the extent to which a programme met its stated objectives such as the one conceived by Tyler in 1942 (Owston, 2008). There are numerous types of evaluation that are not easy to delimit in a single academic paper, inasmuch as the process is used in different fields for different purposes. An evaluation that aims at developing the human

resources would opt for techniques and instruments that are different from the one that targets financial or pedagogical assets. In this section, our focus will be placed on the principal pedagogical and educational types of evaluation.

Basically, the most recurrent types of evaluation frequently used and instructed are placement, diagnostic, formative and summative, the purpose and mechanisms of which are different as they diverge across nine dimensions: function, time, characteristics of evidence, evidence gathering techniques, sampling, scoring and reporting, standards, reliability, and validity (Madaus and Airasian, 1970)

Placement tests, as the name suggests, tend to place the students in the right start-up point and usually takes place at the beginning of a course. It is a compass assessment of the student's pre-requisites, capabilities, learning needs, weaknesses and strengths on an analogical basis where the past achieved knowledge is given passive analogous numbers, while the units, modules and lessons to be instructed in the future are given positive analogous values. In other words, the start-up point is always corresponding to zero regardless of the student's level (Madaus and Airasian, 1970)

Formative evaluation, which is the oldest of all types of evaluation (Dessigner and Moseley (2015), is a mid-way assessment that helps instructors align and tune their inputs with the learner's progress. The term was popularised by Scriven in early 1970s (Scriven, 1972 as cited by Owston, 2008) to refer to the assessment of a programme while it is still on progress. Such a test could have a regular frequency of weeks, months or even more per the nature of the programme. The student's score is not an end by itself and should not be since the test's objective is to locate spots of rectification and help remediate any potential issues.

Summative evaluation was also popularised by Scriven (Owston, 2008) to define the assessment of a programme's outcomes upon completion. It is, essentially, meant to grade and certify the learners, but may also be used to assess the effectiveness of training and the instructor's success or failure to deliver. "*any aspect of the total education or training system can be evaluated: the student, the instructor, instructional strategies, the facilities, even the training organisation itself*" (Smith and Brandenburg, 1991, p. 6)

Diagnostic evaluation, often confused with placement test, aims at identifying the extra-curricular factors that influence the students' performance and behaviour inside the classroom. This type of evaluation is ongoing and requires a continuous attention and sensitivity on the part of the teacher.

As academic research in the field has been widely enriched with world-wide contributions, other types of evaluation have emerged including confirmative, meta, goal based, process-based and outcome-based evaluation (Zinovieff and Rotem, 2008). According to Dessinger and Moseley (2015), traditional testing forms, namely formative and summative, are a bit outdated and may not help to constitute a "full-scope evaluation". They suggest two additional qualitative evaluation models; Confirmative and Meta evaluation.

Confirmative evaluation tends to assess the worthiness of learning in a real-life context. While summative evaluation is past oriented and judges what worked and what did not, confirmative evaluation is future oriented and may not take place immediately after implementation. It tends to investigate the learner's attainment of extended cognitive and behavioural competencies. On the other hand, meta evaluation is simply the process of evaluating evaluation itself to make sure that it aligns with principles of utility, feasibility, accuracy and appropriateness.

The above stated types of evaluation are found in the literature with other designations such as goal-based, process-based and outcome-based, yet they all refer to, relatively, the same concepts mentioned above.

**3.4.2. Programme Evaluation Strategies**

The mission of programme evaluation is a process that targets providing answers to many questions about the programme before while and post the execution such as how did the programme go? where did it fail? how can the mistakes get rectified? what is the ultimate yield of the programme? These sample questions target different execution phases and may get elaborated into more precise amplified questions depending on the embraced strategy. Although some scholars advocate sticking to a single strategy, the evaluation would get more validity and credibility when it adopts multiple strategies; the outcome analysis of a programme, for instance, cannot be interpreted or understood in isolation from a thorough analysis of procedures (Edwards et al., 2007)

Basically, there are three evaluation strategies; goal-based, process-based and outcome-based with different scopes of examination.

**3.4.2.1. Goal-Based Evaluation**

Each programme is supposed to carry a mission statement, standards and goals that need to be met. Goal-Based evaluation envisages the assessment of these goals and whether they were met by the end of the programme (Edwards et al., 2007). A metric assessment of realisation rates, production evolution, growth percentage … are to be compared to the initial programme objectives in order to determine whether it managed to fulfil its potentials. Although the outcomes of this evaluation are quantity oriented, it often fails to deliver when the mission statement is drowned in vague

overgeneralised, and sometimes missing objectives. Following are exemplary

questions of Goal-Based Evaluation (Zinovieff and Rotem 2008):

- Are the programme goals/objectives realisable?

- Are the deployed mechanisms capable of realising these goals?

- Will the on-going implementation progress help to achieve the goals?

- Is the timeline sufficient to achieve the goals?

- Are the personnel appropriately qualified and equipped to realise the mission?

Once the evaluation results are in hand, the evaluation authority may suggest

remedial interventions if: a) the goals, for instance, are set too high or too low for the

execution party, b) the goals are not realisable for the time being, c) the working

conditions are not in favour of the execution plan, d) the allotted time is not sufficient

or too long …

## 3.4.2.2. Process-Based Evaluation

Process-Based evaluations are intended to investigate the mechanisms,

procedures, workflow, communication patterns, activities and decisions by which a

programme operates that are decisive to the programme outcomes. The results

obtained would, eventually, explain successes and failures, contribute to optimising

procedures and define the nature of intervention (Shenderovich et al., 2016). In

general, process evaluations pose questions in two areas: coverage and process

(WHO, 2000). Coverage questions investigate metric/statistic data (how much and

how many?), while process questions reveal the appropriateness of steps and

measures (how and why?). Moore et al. (2014), on the other hand, coined four

components of process-based evaluation:

- Dose: the amount of intervention being delivered by the programme

- Uptake: The amount of profit being received by participants

- Reach: The number of target population that benefits from the programme

- Fidelity: The extent to which the programme output is consistent with intended objectives (Mihalic, 2004 as cited in Shenderovich et al, 2016)

Edwards et al. (2007) draw attention to the fact that process-based evaluation ought to consider the correspondence of stakeholders' perceptions, namely the *staff's* and *user's*. The step-by-step descriptions of the process as put by the staff and the mutual understanding of focal points are primordial to the attainment of the end results by the user. Therefore, the evaluation should examine the conformity and analogy of procedures by both parties.

### 3.4.2.3. Outcome-Based Evaluation

It is the most common of the three evaluation approaches. This approach examines the results of the programme. In the literature, it is essential to differentiate between outcomes and outputs, and to make sure the process of evaluation is focused on outcomes rather than outputs. The inability to differentiate between the two would eventually jeopardise the whole process and end up with misleading results. While outputs are extrinsic and manifest in programmes, trainings and workshops, the outcomes are the results of these trainings including knowledge transferred and behaviour changed. (Mills-Scofield, 2012). As far as programme evaluation is concerned, outputs are the apparatus deployed, the training courses given and the purchased digital resources, whereas the outcomes are the changes that took place thanks to the outputs including the change of practices, acquired competencies and knowledge improvements. This distinction is extremely crucial particularly because

an improvement of the outputs does not necessarily translate into an equivalent success to deliver at the outcomes level (Edwards et al. 2007).

Having listed the three strategies, it is important to stress on the fact that each approach will serve as a single piece of the whole picture. Putting all the pieces together makes the picture clearer for what it is or what it is not. Although academics qualify some evaluation models such as Kirkpatrick's, for instance, as goal based (Zinovieff and Rotem 2008) (Eseryel 2002), it is difficult to endorse this classification and take it for granted since the model incorporates an evaluation of a) "reaction" of participants at *the end* of the training, b)"learning" to assess whether the learning objectives are met, c) "behaviour" to examine any noticeable changes of performance, in addition to d) "results" which are more outcomes oriented.

### 3.4.2.4. Other approaches

While the goal-based approach remains the most dominant thanks to the popularity of affiliated models including Kirkpatrick's, there are, still, other approaches used in the field. In this section, other approaches are roughly listed for the sake of mere enrichment.  The Indiana University, which conceived an independent model of its own, lists other approaches as follows (Zinovieff and Rotem, 2008):

- Goal-Free Evaluation: does not consider initial goals and the extent to which they are achieved. It tends to reveal any potential benefits of "intervention" such as an increase of production, sales, performance, etc.

- Responsive Evaluation: is meant to measure the effectiveness of educational programmes. Compared to most other approaches, it draws attention to programme activity, uniqueness and the social plurality of its people

- The Systems Approach: the evaluation examines the efficiency and effectiveness of the process of intervention

- Professional Review Evaluation: conducted by an external expert to appraise the programme instead of carrying out the process by an insider party

- The Quasi-Legal Approach: is performed by a court of inquiry instituted by the government to look into failures or suspicious conducts. The final judgement is based on presented evidence and testimonials.

## 3.5. Programme Evaluation Models

### 3.5.1. Donald Kirkpatrick's levels of evaluation (1959)

In 1959, Donald Kirkpatrick proposed 4 basic levels of evaluation published in the *Training and Development Journal* to make up a reference mark for most, if not all, subsequent models of evaluation. When launched for the first time, it made part of a project on evaluating a supervisory training programme, yet the model's simplicity, effectiveness and comprehensiveness required in any evaluation process makes it a good fit  for a wide range of study fields including medicine, higher education, vocational education in enterprises, blended learning, ICT, etc (Moldovan, 2015) (Alliger and Janak, 1989, cited in Tamkin et al. 2002). Because of the ever-evolving research on evaluation, Kirkpatrick had to consistently adapt or update the levels' guidelines, while the four levels (reaction/learning/behaviour/evaluation) remained unchangeable. The levels are also referred to as steps or even taxonomy as each one leads to a more elaborate level that is *"more difficult and time-consuming, but ... also provides more valuable information"* (Kirkpatrick, 2006, p. 25).

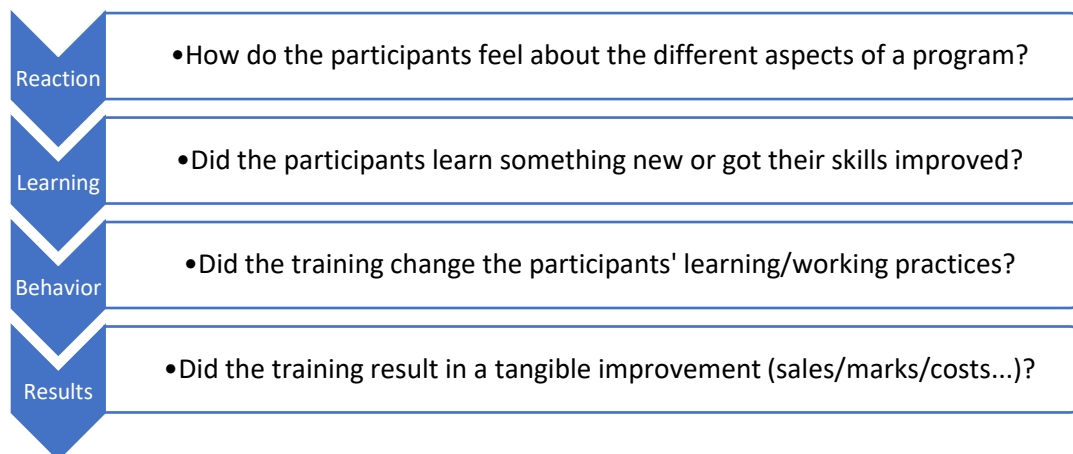| | •How do the participants feel about the different aspects of a program? |
|---|---|
| Reaction | |
| Learning | •Did the participants learn something new or got their skills improved? |
| Behavior | •Did the training change the participants' learning/working practices? |
| Results | •Did the training result in a tangible improvement (sales/marks/costs...)? |

Figure 8: Kirkpatrick's Levels of Evaluation

a.      **Reaction:** Kirkpatrick also calls it a "measure of customer satisfaction" (Kirkpatrick, 1996). A customer according to him is anyone who takes part of the training course whether they paid for it or not, whether it was voluntary or forced by an organisation. Although the model was conceived about 60 years ago, Kirkpatrick adopts a bottom-up approach to the evaluation process as he believes that the positive reactions of trainees are important for trainers and for those who make public programmes.

The model suggests eight "guidelines" for evaluating reaction

1. The evaluation process should set clear objectives

2. The design of the form should generate easy to interpret reactions

3. Written comments and suggestions are encouraged

4. No delay in retrieving responses

5. Responses should be honest

6. Feedback should align with acceptable standards of calculation

7. Feedback should call for appropriate reaction

8. Reactions should be communicated appropriately

The reaction phase is conducted through comments and suggestions to measure the participants' satisfaction with the content, method, instructor, material, schedule and all the components of the programme. Investigating the trainees' feelings and attitudes towards a particular training is a form of attributing a humanistic aspect to the process of evaluation, which explains why many scholars *"call the forms that are used for the evaluation of reaction 'happiness sheets'."* (Kirkpatrick, 2006, p. 27).

Following, are three checklist samples that illustrate different types of questions such as open-ended, multiple-choice, ordinal scale, interval scale and ratio scale. The scoring formats change according to precision required and the method by which the feedback is analysed.

In order to determine the effectiveness of the program in meeting your needs and interests, we need your input. Please give us your reactions, and make any comments or suggestions that will help us to serve you.

*Instructions:* Please circle the appropriate response after each statement.

|  | Strongly disagree | | | Agree | | | Strongly agree | |
|---|---|---|---|---|---|---|---|---|
| 1. The material covered in the program was relevant to my job. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 2. The material was presented in an interesting way. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3. The instructor was an effective communicator. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 4. The instructor was well prepared. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 5. The audiovisual aids were effective. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 6. The handouts will be of help to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 7. I will be able to apply much of the material to my job. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 8. The facilities were suitable. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9. The schedule was suitable. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 10. There was a good balance between presentation and group involvement. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 11. I feel that the workshop will help me do my job better. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

What would have improved the program?

Figure 9: Kirkpatrick's reaction sheet sample: see Kirkpatrick, D. and Kirkpatrick, J. (2012). *Evaluating training programmes*. San Francisco: Berrett-Koehler, p.31.

Please give us your frank reactions and comments. They will help us to evaluate this program and improve future programs.

Leader _____    Subject _____

1. How do you rate the subject? (interest, benefit, etc.)

   _____ Excellent                  Comments and suggestions:

   _____ Very good

   _____ Good

   _____ Fair

   _____ Poor

2. How do you rate the conference leader? (knowledge of subject matter, ability to communicate,etc.)

   _____ Excellent                  Comments and suggestions:

   _____ Very good

   _____ Good

   _____ Fair

   _____ Poor

3. How do you rate the facilities? (comfort, convenience, etc.)

   _____ Excellent                  Comments and suggestions:

   _____ Very good

   _____ Good

   _____ Fair

   _____ Poor

4. How do you rate the schedule?

   _____ Excellent                  Comments and suggestions:

   _____ Very good

   _____ Good

   _____ Fair

   _____ Poor

5. What would have improved the program?

Figure10: Kirkpatrick's reaction sheet sample: see Kirkpatrick, D. and Kirkpatrick, J. (2012). Evaluating training programmes. San Francisco: Berrett-Koehler, p.29.

Dear Client,

We would like to have your comments and suggestions to enable us to offer you the kind of service you would like.

Would you help us by ticking the face that is most indicative of your feelings:

☐ breakfast ☐ lunch

*Very good* *Good* *Average*

1. Are you satisfied with the quality of the meals?

2. Are you satisfied with the variety of dishes available?

Figure 11: Kirkpatrick's reaction sheet sample (excerpt): see Kirkpatrick, D. and Kirkpatrick, J. (2012). *Evaluating training programmes*. San Francisco: Berrett-Koehler, p.33.

The three sample checklists reflect Kirkpatrick's comprehensiveness and flexibility in approaching evaluation needs as the model leaves considerable room for autonomy and freedom of choice as far as formats and questions.

b. **Learning:** This step measures the effectiveness of learning process and the impact it made on the learners at one of these levels: knowledge, skills or attitudes. Certain programmes target enhancing one of these competencies such as languages or engineering, while others can incorporate integrative approaches to enhance two or even three such as motivation and communication courses. The evaluator, therefore, must determine clearly their objectives to remain on a safe side.

Kirkpatrick (2012), after long years of experience in the field as a practicing theorist, proclaims that epic presentations, where showmanship, fancy visual aids and illustrations are abundant, have no guarantee that learning is actually taking place. He also recommends following these guidelines

- Using a control group if possible

- Evaluating trainees before and after the programme using the adequate measures.

- Getting a 100 percent response and analysing the results statistically

- Using the results of the evaluation to take appropriate measures

    The transition towards the next level "behaviour" according to Kirkpatrick is to take place if and only if a constructive change is acknowledged at the level of knowledge, attitude, skills or all of them. It is argued that investment in evaluation is likely to stop at this level, especially in private sector, due to the compelling financial and timely constraints (Zinovieff and Rotem, 2008).

c. **Behaviour:** This step is referred to as transfer of training. It examines whether the training has impacted the learner's behaviour at work or school as intended by the institution after attending a particular training. Kirkpatrick, as stated earlier in this chapter, draws attention to the fact that institutions that carry out evaluation are likely to skip behaviour and results evaluation; nevertheless, some institutes bypass the first two levels to address particularly behaviour evaluation from the very beginning. He disapprovingly does not recommend the procedure and even calls it a *"serious mistake"* because a programme's failure to deliver at the level of behaviour does not impulsively mean that it failed to deliver at the level of reaction and learning.

    This level requires the pre-existence of four basic requirements

- There must be an intrinsic drive for change by adopting a positive attitude

- The person must know what and how to do it by learning the essential knowledge and skills

- The work climate must favour change that should be promoted by the immediate supervisor who is supposed to act as a leader not just a superior

- As a sign of recognition, the change must be rewarded for in the form of financial and moral compensation.

When one of the above requirements is unfavourable or neutral, behaviour change becomes at stake and will heavily depend on the three other factors that will bolster the process. The significance of this level of evaluation resides in the fact that when a learner fails to concretise in real life what they have learned theoretically, learning loses much of its validity and credibility.

d. **Results:** This step examines the final results and the effects of the training on learners and institution as well. Optimal results should, for instance, reveal an increase of profit, better quality products, better graduation rates, cost reduction, reinforcement of desirable practices and values, lower drop-out rates, etc. *"It is important to recognise that results like these are the reason for having some training programmes. Therefore, the final objectives of the training programme need to be stated in these terms"* (Kirkpatrick, 2009, p. 33)

When the desired result of a programme is to change attitudes of workers, e.g. communicative, managerial, or decision-making skills, Kirkpatrick admits it is hard to implement this level of evaluation due the immeasurable nature of these components. He suggests the use of nonfinancial terms such as "improved morale". To sum up, large scale evaluation, that incorporates the four levels, conducted by governments, organisations and corporations could be time and money consuming; still, Kirkpatrick favours the adoption of the four levels to remain faithful to the basics of academic evaluation in terms of validity, credibility and reliability. Surveys reported that only 10% of organisations attempted to conduct result-based evaluation (Lookatch, 1991) (Amercian Society for Training and Development, 2002, cited in Jain, 2014)

**3.5.2. Limitations of Kirkpatrick's Model:**

Although the model has formed the corner stone of programme evaluation for decades, and the levels are adopted and later adapted by other models, Kirkpatrick's taxonomy has recently come under criticism (Tamkin et al. 2002). Tamkin claims that some of these criticisms stem from a "misunderstanding" that the arrangement of levels makes level 1, for instance, look less significant than level 4.

> *One of the common criticisms is based on a misunderstanding that the levels are arranged in ascending value of information, with results data being viewed as more important than reactions. Bernthal (1995) argues that the model mixes evaluation and effectiveness and that these do not form a continuum. However, the model was not meant to be seen as a hierarchy when it was first developed and it is clear that the value of the information will depend on the type of evaluation required. (Tamkin et al., 2002, p. 4)*

In his attempt to approach the misunderstanding, Owston (2008) explains that the model was first introduced in 1959, but the detailed elaboration of features was produced only recently. Scholars, hence, reacted to the taxonomy according to their own interpretation, not what Kirkpatrick had intended to convey. Also, a study conducted in 2002 revealed that failure to engage in learning (new attitudes, knowledge and skills) is due to the lack of experience, tools and infrastructure rather than the lack of interest or importance (Chang, 2010). Another survey concluded that considering level 4's (result/organisation impact evaluation) complexity of analysis, time constraints, high cost and weak familiarity with the process are amongst the major barriers that inhibit the realisation of the evaluation (Strunk, 1999, cited in Chang, 2010).

Gill (2011) introduces six reasons why *"this approach does not produce the information needed to continuously improve performance and achieve business results"*. First, a positive feedback/reaction from interviewees, which Kirkpatrick stresses on, is no guarantee that learning has taken place. Second, self-report surveys are unreliable and subjective; hence, their interpretation must be meticulous. Third, the relevance of evaluation is supposed be unequivocal i.e. it must be carried out as a routine that reinforces the learning process. Fourth, it is difficult to anticipate the outcomes of certain trainings such as leadership programmes and, consequently, it should be hard to form standard questionnaires beforehand. Fifth, sticking to Kirkpatrick's model literally and observing its guidelines firmly would leave us asking the questions: is this the right thing to do? Is it the best option available? Sixth, Gill advocates that performance improvement is not the result of training alone. According to him, comparing the pre-requisites to the post-requisites reveals if there is a progression but does not result in the magic recipe of better results (Gill, 2011).

Zinovieff and Rotem (2008) argue that the first two levels reaction and learning are the most controversial. Based on their expertise in the field, they notice that some critics have issues addressing reactions without examining the organisational context, values, practices and current situation. A thorough study of the organisational needs, objectives and allocation of resources helps draft the most suitable objectives as well as solutions to potential obstacles. Zinovieff and Rotem also reiterate the fact that a positive review does not mean that learning has taken place, and unlike other models, Kirkpatrick's places little interest on the financial benefits of the programme on the organisation and the economy.

Holton (1996) and others note that Kirkpatrick's four levels are flawed because; first, the hierarchy of values implies that their ranking reflects their

significance; second, levels are bound and interdependent that primary ones cannot be skipped; third, it is too simple and does not provide answers on the variables that affect learning; fourth, it implies that the target performance during training should last after training and ignores the organisation's atmosphere as a catalyst or inhibitor of change.

### 3.5.3. Stufflebeam's CIPP Model (1971)

The CIPP Model, which is intended to provide guidance for formative and summative evaluation, was developed in the late 1960s and introduced in 1971 by Daniel Stufflebeam as a reaction to Kirkpatrick's model of evaluation and all the so-called goal-based ones submerged in opacity of procedures and techniques resulting in inconsistent interpretations (Owston, 2008) (Stufflebeam, 1993). The model was a contribution to help improve teaching practices in federally funded US public school projects (Stufflebeam and Coryn, 2014).

In his introduction of the perceptual framework of the CIPP approach, Stufflebeam seems to criticise what he thinks lacunae in concurrent ones oriented towards objectives, testing and experimental design. Although he does not bluntly put it, his selective illustration of barely known evaluation models and total negligence of Kirkpatrick's suggests that he refers to the latter in his criticism:

> *"The CIPP approach is based on the view that the most important purpose of evaluation is not to prove but to improve. It is a move against the view that evaluations should be "witch hunts" or only instruments of accountability. Instead, it sees evaluation as a tool by which to help make programmes work better for the people they are intended to* serve."* (Scriven et al, 1983, p. 16)

The model's ongoing updates, from its birth in 1971 through 2017, contributed to rendering the model more popular, rich and mature to fit in different knowledge

and service areas including education, housing, community development, transportation safety, and military personnel review systems (Stufflebeam and Coryn, 2014). It is yet beyond the doubt that Kirkpatrick's reaction, learning, behaviour and results model was influencing and inspiring to other models including Stufflebeam's model (Tamkin et al., 2002) (Chang, 2010) (Eseryel, 2002). CIPP is unique due to its popularity in educational evaluation rather than focusing on corporate training programmes (Owston, 2008). Although the model was developed in late 1960s, it has been placed within the realm of new approaches to evaluation that adopt a learning-by-doing approach, and suggests that objective-based, peer or expert review of site visits are classical and *"proved to be of* <u>*limited use*</u> *and often* <u>*unworkable*</u> *and even* <u>*counterproductive*</u> *for evaluating emergent federal programmes in dynamic social contexts and particularly public-school districts"* (Stufflebeam and Coryn, 2014). Still, Stufflebeam's biting criticism claim is not supported by any evidence of any sort, which leaves an "impression" that the statement, to say the least, is but a promotion of the model at the expense of others. The impression is reinforced by the fact that Stufflebeam devotes an independent section in most, if not all, his publications to the model's range of applications and adopting institutions by name.

As the acronym suggests, CIPP refers to 4 components Stufflebeam and Coryn (2014) prefer to refer to as "categories" rather than levels. They are of paramount relevance for both decision making while the programme is on progress (formative orientated) and accountability when the procedures come to an end (summative orientated):

"C" for Context evaluation

"I" for Input evaluation

"P" for Process evaluation

"P" for Product evaluation

| | Evaluation Types | | | |
|---|---|---|---|---|
| | *Context* | *Input* | *Process* | *Product* |
| *Decisionmaking (formative orientation)* | Guidance for choice of objectives and assignment of priorities | Guidance for choice of program strategy<br><br>Input for specification of procedural design | Guidance for implementation | Guidance for termination, continuation, modification, or installation |
| *Accountability (summative orientation)* | Record of objectives and bases for their choice along with a record of needs, opportunities, and problems | Record of chosen strategy and design and reasons for their choice over other alternatives | Record of the actual process | Record of attainments and recycling decisions |

Table 4: The Relevance of Four Evaluation Types to Decision Making and Accountability. See: Stufflebeam, Daniel L. "The CIPP model for programme evaluation." Evaluation models. Springer, Dordrecht, 1993. 117-141.

Following, is the definition of the four procedures as presented by Stufflebeam (1983) (1993) (2014).

**a. Context Evaluation**: This evaluation generates data about the pre-existing conditions such as needs, problems, target population, opportunities and dynamics that either have to be capitalised on or rectified. Decision makers, accordingly, set the goals that should lead to the programme's success, the road map to be followed and the solutions to incidental problems. The evaluation findings, then, are presented to the inspecting bodies and programme's stakeholders for examination to see whether the programme was/will be governed by the appropriate goals and decide if the envisaged solutions to problems had/will have any effects on the outcomes.

**b. Input Evaluation:** This evaluation conducted by an advocacy team helps, initially, better outline the execution plan by identifying the optimal approaches and alternative ones. After that, experts assess the procedural plans, staff recruitment in addition to the invested budget. The appropriate investment of financial provisions, funding proposals, work power, resources, schedule, etc. are crucial to deciding on the most suitable plans for the programme and why they were chosen over others. Stufflebeam suggests carrying out input evaluation throughout a series of stages beginning with literature search and visits to exemplary programmes. The input summary note should generate and assess competing programme strategies; prepare an accountability record of why a particular solution strategy was selected; exploit bias and competition in a constructive search for alternatives; and finally involve personnel in the system.

**c. Process Evaluation:** This evaluation is characterised by the study of procedural implementation of plans to provide feedback to managers and staff about the progress of execution and its conformity to the start-up plans. It is meant to be a backup procedure that provides an ongoing guidance on where to adapt, omit or supplement in case the initial goals proved to be wrong or at risk of coming to nothing. *"The main use of process evaluation is to obtain feedback that can aid staff to carry out a programme as it was planned, or, if the plan is found to be seriously flawed, to modify it as needed"* (Stufflebeam, 1994). Stufflebeam adds that process evaluation must constantly monitor the participants' attitude towards the project, their acceptance of their roles, their capacity to carry out their missions, their judgement of the quality and finally the execution cost. This mission has to be carried out by an evaluation expert not by the staff themselves "*More often than not, a programme staff's failure to obtain guidance for implementation and to document their activities is due to a failure to assign anyone to do this work"* (Madaus et al, 1983, p. 4*)*.

**d. Product Evaluation:** It is meant to measure, interpret and judge the extent to which a programme has been successful in accomplishing its goals. Although this type of evaluation has to be conducted in the light of initial goals, Stufflebeam was meticulous not to use the term "goal" in the description of product evaluation in all his publications. He instead used terms like "needs" and "objectives" apparently for fear of getting the model categorised as a goal-based one; the model which he had long criticised. He, on the other hand, seems to highly appreciate the individual's needs satisfaction, which allows to generate a reference index as in Kirkpatrick's reaction level [6].

> "*An outcome associated with an individual may be classified as a success or failure depending on whether it has satisfied a diagnosed need of the individual; such product evaluation at the level of individuals also allows aggregation across individuals to get an overall <u>index</u> of the extent to which the programme has succeeded in meeting the collective and differential needs of individuals*" (Stufflebeam, 1994, p. 334).

Product evaluation investigates intended and unintended effects, gathers and analyses judgements from the target population, compares the outcomes with those of other programmes, compares the financial cost to the needs and services received, and provides a justification for lacunas.

**3.5.4. Limitations of CIPP:**

The CIPP has been a widely credited evaluation model which proved to be reliable throughout almost 50 years of continuous revitalisation and enrichment by

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[6] The reference index also called the threshold is determined by the institution that conducts the evaluation in order to decide the success or failure of programme.

Stufflebeam (2017) in 21 books and over 100 articles and book chapters[7]. In each of Stufflebeam's books, articles, briefings and reviews, he answers new questions raised in seminars, elaborates on points that require further amplification, provides sample checklists, etc. A remarkable strength which renders CIPP more desirable than Kirkpatrick's 4 levels is the clear-cut distinction between each of the four components, which makes them independent and possible to conduct separately (Harrison ,1993 as cited by Hakan and Seval, 2011). Its combination of formative evaluation (context, input, process) with summative evaluation (product) makes it integrative and inclusive that no part of the programme would be overlooked.[8] CIPP, however, has been criticised by many scholars for the following. First, the CIPP may not always provide answers to some significant questions and issues and may not be efficient in terms of time and budget; adopting another model, then, becomes primordial (Worthern et al., as cited in Hakan and Seval 2011). Second, this evaluation requires meticulous planning and lots of data mining techniques to *"address each type of data or evaluation questions"*[9]. Third, the model could be confused to other types of evaluation such as needs assessment. Finally, it is not as widely known as Kirkpatrick's model in performance improvement.[10]

| Evaluation Model | Kirkpatrick (1959-2016) | CIPP Model (1971-2017) |
|---|---|---|
| Characteristics | Level 1: Reaction: investigating the participants reactions at the end of a training programme | 1. Context: evaluators assess needs, problems, assets, and opportunities, plus relevant contextual conditions and dynamics. |
| | Level 2: Learning: determining what knowledge, attitudes, and | 2.Decision makers identify and choose among competing plans, |

[7] See a brief biography of Stufflebeam in https://www.guilford.com/books/The-CIPP-Evaluation-Model/Stufflebeam-Zhang/9781462529230/authors
[8] https://prezi.com/x-4swyzopmct/cipp-model/
[9] https://prezi.com/x-4swyzopmct/cipp-model/
[10] https://www.safaribooksonline.com/library/view/performance-evaluation-proven/9780787988838/ch008-sec008.html

| | skills were learned in the training. | funding proposals, allocate resources, assign staff, schedule work… |
|---|---|---|
| | Level 3: Behaviour: to inspect any job performance changes as a result of training | 3. Process: evaluators monitor, document, assess, and report on the implementation of programme plans |
| | Level 4: Results: the expected outcomes of most educational training programmes such as reduced costs, reduced absenteeism, improved profits or morale, and increased production | 4. Product: evaluators identify and assess costs and outcomes intended and unintended, short term and long term. |

Table 5: Source: Stufflebeam, D. L., & Coryn, C. L. (2014). *Evaluation theory, models, and applications* (Vol. 50). John Wiley & Sons. Source 2: Jain, S. (2016) "Methods Of Training Programmes Evaluation: A Review." The Journal of Commerce, vol 6, no. 2, pp. 19-30.

### 3.5.5. Guskey's Critical Five Levels (2000)

Dr Thomas Guskey, the expert in evaluation design, analysis, and educational reform, finds that Kirkpatrick's 4 levels could be adopted and adapted to the arena of education. Guskey's model (2000), also called Continuing Professional Development (CPD), gained currency and academic eminence since it is tailored to meet the needs of educational purposes. Still, in his attempt to advance his own amendment of the model, he suggests 5 critical levels. The success of each depends on the success of the preceding one (Guskey, 2013).
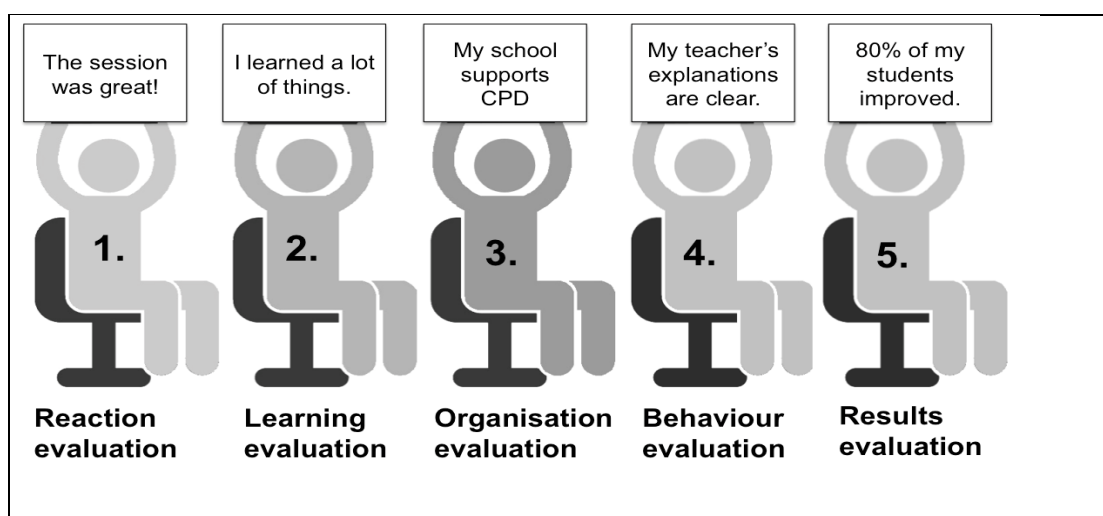


Figure 12: Guskey's critical levels. Source: Stock, P. (2016). Evaluating CPD: hard but not impossible. [online] must do better... Available at:

https://joeybagstock.wordpress.com/2016/04/09/evaluating-cpd-hard-but-not-impossible/ [Accessed 14 Feb. 2018].

a. *Level 1: Participant reaction:*

Just like Kirkpatrick's model, the reaction evaluation investigates and measures the participants' satisfaction and impressions about the training, material, timing, the environment, the leader, etc. It is the easiest of all levels and is usually conducted using a questionnaire at the end of the session. The feedback is used to enhance the programme's design and delivery.

b. *Level 2: Participant learning*

This evaluation is meant to make sure that the participants have successfully acquired the intended knowledge and skills. Different instruments are deployed at this level such as portfolios, demonstrations, personal reflections, simulations, paper-and-pencil tests, etc. This evaluation is imperative to the improvement of content, format, and organisation of work.

c. *Level 3: Organisational support and learning*

This level is a defining feature of Guskey's model that makes it distinct from Kirkpatrick's. At this level, focus shifts towards the analysis of how the organisation, or the governing body, supports and reinforces the newly acquired skills and knowledge. Among the questions to be asked, Guskey (2002) (2013) states the following:

Was the implementation advocated, facilitated, and supported?

Was the support public and overt?

Were problems addressed quickly and efficiently?

Were sufficient resources made available?

Were successes recognised and shared?

What was the impact on the organisation?

Did it affect the organisation's climate and procedures?

Negative results at this level are by no means an indicator of training failure but are rather the result of obstructive policies that undermine implementation efforts and consequently blur the success achieved in the first two levels (Sparks & Hirsh, 1997, cited in Guskey, 2013). This evaluation is conducted on a large scale by programme stakeholders via district meetings, questionnaires addressed to school administrators, structured interviews or unobtrusive observations.

d. *Level 4: Participant use of new knowledge and skills*

This level is similar to Kirkpatrick's behaviour evaluation that investigates whether the participants make use of their newly acquired skills and knowledge and implement them in real life or business contexts. As coping with new practices and behaviours does not take place overnight, the assessment of participant's use of new knowledge and skills should be gradual and belated. Like the preceding level, the evaluation is conducted by means of questionnaires, interviews, observations of superiors, etc.

e. *Level 5: Student learning outcomes*

Unlike other evaluation models, such as Stufflebeam's, Phillip's and even Kirkpatrick's at a later stage that particularly examined the merits of a programme by means of its ROI, Tomas Guskey had the student and only the student in mind as the most salient area of evaluation. *"Using five critical levels of evaluation, you can improve your school's professional development programme. But be sure to start with the desired result—improved student outcomes"* (Guskey, 2002, p.45). Still, the information gathered by stakeholders or commissioned experts could be used to assess the ROI, although it is not the target point of this level by itself. This evaluation

serves to correlate the student learning objectives with the learning outcomes. These outcomes may take different shapes and forms ranging from cognitive (knowledge) and affective (attitude) up to psychomotor (skills and behaviour). Among the pertinent questions to be answered, Guskey (2002) (2013) suggests:

What was the impact on students?

Did it affect the student's performance or achievement?

Did it influence students' physical or emotional well-being?

Are the students more confident as learners?

Is student attendance improving?

Are dropouts decreasing?

The deployed techniques are conventional summative tests and grades in addition to direct observation.

### 3.5.6. Limitations of Guskey's CPD

As this evaluation is based on Kirkpatrick's model, both share lots of lacunas and imperfections at the level of conceptualisation as well as execution. In a 2005 report, Goodall et al. (2005) listed the following limitations acknowledged by Guskey himself and other experts:

*Participants' reactions:* reports and feedback generated at this stage that incorporate content, process and context questions always lead to answers submerged with subjectivity and impressionism to make this evaluation less constructive.

*Participants' learning:* as learning could be cognitive, affective or behavioural, the acquired competencies should by the same token be measured in different techniques that necessitate substantial investments of efforts, time and money.

*Organisational Support and Change:* rendering new instructions into a new practice calls for a favourable climate that encourages and promotes change. Nonetheless, the change may not take place if the individual's innate drive is meagre, their professional and personal values are contradicting with those of the organisation, or if the pre-existing atmosphere is obstructive and counterproductive.

*Participants' Use of New Knowledge and Skills:* given that this evaluation will have to take place after a considerable amount of time, it becomes a bit challenging to know when it should be conducted depending on the complexity of knowledge or skills to be acquired (Grace, 2001, cited in Goodall, 2005).

*Student Outcomes:* Goodall (2005) argues that the fifth level is "*the one least likely to be measured in evaluations at present*". This is due to the complexity of the procedure that necessitates cognitive and non-cognitive methods and tests. In addition, the model seems to ignore the costs that may overweigh the benefits, which is a big concern for organisations that place the ROI as a priority.

### 3.5.7. Other Evaluation Models

As this study tries to synthesise a concise review of other evaluation models, it comes across an endless number of models and experiments conceived by researchers, organisations, institutes and renowned universities. Kirkpatrick's model, though, remains the most popular one used by not only training experts, but also researchers working on the evaluation of training actions (Gilibert and Gillet, 2011). Following is a brief summary of the most important concurrent models.

### 3.5.7.1. E-learning Evaluation Model

Instructional Technology, e-learning and online learning, being futuristic and innovational study fields, have recently drawn the attention of scholars who enriched the academic field with books, articles, reviews, etc. One, thus, cannot help asking: Are the conventional evaluation approaches and methods applicable to this newly established arena of research? How can an approach or a model that was elaborated in the 1950s or even earlier of last century provide a credited platform to judge the worthiness of a programme that is launched less than a decade ago? Is it not time to adopt a new model that fits precisely the needs of institutes that run ICT programmes?

William Horton (2001), for whom Donald Kirkpatrick has occasionally expressed his admiration and appreciation, confidently answers that the four-level framework applies quite well in this prospect. Although the argument may seem naïve and primitive, Horton (2001) insightfully asserts that the purpose of evaluation is getting to the results rather than being concerned with the means; what matters the most is achieving the results regardless of the mechanisms.

> *Like all effective engineering models of evaluation, it concerned itself solely with the results rather than the mechanisms used to accomplish those results. What we evaluate is not the artefacts or apparatus of learning but the outcome. The outcome of learning resides with the learners, not the pens, pencils, chalkboards, whiteboards, hardware, software, or other paraphernalia of learning. Since we are measuring results rather than mechanisms, we can use this framework to evaluate e-learning as we do to evaluate other forms of learning.* (Horton, 2006, p.36)

Following is the suggested adaptation of the four levels as perceptualized by Horton (2006)

Level 1: Reaction

At this level it would be absurd to interpret the positive feedback as a success of the training course for reasons explained earlier. Nevertheless, it is recommended to detect emotional acceptance of e-learning by gathering testimonials that generate a positive motivational "buzz" around e-learning.

Level 2: Learning

Learning evaluation is supposed to keep pace with technological advances by technologically administering, scoring, recording and reporting. The proper usage of technology helps the evaluator overcome routine paper and ink nuisance including effort, cost and scoring.

Level 3: Behaviour

Because behaviour change is about changing practices rather than changing digital competencies, traditional mechanisms of behaviour assessment including checklists, surveys, interviews … are still applicable.

Level 4: Results

Horton (2006) seems to be aware of Kirkpatrick's fourth level flaws and proposes conducting result evaluation in terms of both return on investment (ROI) as proposed by Jack Phillips, and moral performance. When the programme's stakeholders are capable of allocating a monetary value for the training and the desirable outcomes, then a mathematical calculation should reveal the success or failure of training. This is not always the case because some desirable changes like raising social responsibility or leadership are hard to be translated into measurable metrics; hence, the results are to be estimated in terms of the training moral performance.

Recently, and thanks to the wide-open prospects proposed by technology, human resource managers became more interested in system-based models that incorporate technology, e-learning and online learning. These models are used particularly to evaluate scientific achievements such as the "Continuous Evaluation of Training Systems Based on Virtual Reality" (Zinovieff and Rotem 2008) (Hillage, 2001).

Scanlon et al. (2000) introduced a framework that summarises 25 years of experience in technology evaluation they accumulated at the Open University in the United Kingdom. The CIAO framework consists of three dimensions: Context, Interactions and Outcomes. At context level, the evaluation tries to answer why, how and where technology is used within the course. The interaction evaluation investigates how students interact with their peers and their teachers. The outcomes evaluation, eventually, examines and inspects any changes (cognitive, behavioural…) that took place after using technology.

| | Context | Interactions | Outcomes |
|---|---|---|---|
| *Rationale* | - To evaluate technology, we need to know about its aims and the context of its use | - Observing students and obtaining process data help us to understand why and how some element works in addition to whether or not it works | - Being able to attribute learning outcomes to technology when it is one part of a multifaceted course is very difficult. It is important to try to assess both cognitive and affective learning outcomes (e.g., changes in perceptions and attitudes). |
| *Data* | - Designers' and course teams' aims<br>- Policy documents and meeting records | - Records of student interactions<br>- Student diaries<br>- Online logs | - Measures of learning<br>- Changes in students' attitudes and perceptions |
| *Methods* | - Interviews with technology programme designers and course team members Analysis of policy documents | - Observation<br>- Diaries<br>- Video/audio and computer recording | - Interviews<br>- Questionnaires<br>- Tests |

Table 6: *CIAO framework.* Source: Adapted from Scanlon, E. et al., Educ. Technol. Soc., 3(4), 101–107, 2000.

### 3.5.7.2. Phillip's ROI (Return on Investment 1995)

One of the major criticisms addressed to Kirkpatrick's model, being goal-based, is leaving out the financial factor. Jack Phillips introduced the return on investment (ROI) evaluation as level 5 of Kirkpatrick's levels of evaluation. This evaluation seeks to justify the cost of the programme regarding the achieved results and to answer the question 'Is the monetary value of results equal to the cost of the programme?'. ROI in this sense shifts the focus from satisfying the needs of trainees to the enhancement of organisational impact (Zinovieff and Rotem, 2008). All the reference indexes, therefore, are converted into corresponding monetary values that prove the success or failure of training.

### 3.5.7.3. Kearns and Miller KPMT model (1997)

It has many similarities to Phillip's model. Kearns and Miller argue that clear objectives are essential to the process of evaluation; when not clearly stated and defined by the organisation, no training is required at all (Tamkin, 2002) (Zinovieff and Rotem, 2008). Farther, the evaluation becomes urgent when the business is not performing well and when there is a plan to exploit new markets. KPMT differs from Phillip's model at the level of executive procedures of the process as they suggest a "toolkit" that helps determine the bottom-line objectives *through questioning techniques, evaluating existing training, and using process mapping to identify the added value to organisations".*

This model consists of four levels as Kirkpatrick's

- Reaction to training and development

- Learning

- Transfer to the workplace/behaviour

- Bottom line added value

Kearns and Miller model is still unique in its notion that return on investment can only be looked at in hard terms; any desirable change (e.g. change of behaviour, promoting a product…) should be given a monetary value that will be examined by the end of the process and compared to the customer spend or number of costumers, etc. (Tamkin, 2002)

### 3.5.7.4 Hamblin's Five Level Approach (1974)

Hamblin was one of the first scholars to propose adjustments to Kirkpatrick's 4 levels of evaluation (1968) which he modified and improved in 1974 (Sharma, 2016). He adopted the first three levels (reaction, learning, job behaviour) as they are, but divided the last one into organisation and ultimate value.

- The organisation level inspects the effect of training on organisation, such as production evolution or performance changes.
- The ultimate value investigates the financial effect of training on the organisation and the economy.

While Kirkpatrick suggests that his four levels do not form a hierarchy, Hamblin plainly asserts that the five levels of his model are hierarchic i.e. the higher the level is, the more significant it should be regarded (Sharma, 2016).

### 3.5.7.5. Indiana University Taxonomy (1996)

Indiana University adopted Kirkpatrick's four levels and added 2 others. The model conceived by Molenda Pershing and Reigheluth was presented as a taxonomy of six strata: activity, participant reactions, participant learning, transfer of training, business impact, social impact. The new activity strata as well as the social impact

examine the training volume and participant's level in addition to the impact on

society respectively (Zinovieff and Rotem, 2008).

Chapter IV:

Literature Review and Related Studies

**4.1. The Experience of SchoolNet and Affiliated Programmes in Canada: SchoolNet, First Nations SchoolNet, Computers for Schools**

The idea of conducting an impact evaluation on ICTE in Morocco, particularly that of GENIE, was animated after reading a series of research papers and heated debates that stirred long controversy in Canada over similar ICTE programmes since 2000. The umbrella programme of all these programmes is Canada's SchoolNet that was launched in 1993 as a partnership that involves provincial and territorial governments, the education community and the private sector with the aim of improving ICT in learning. At a time when internet was beyond reach for most Moroccans, over 2,5 million Canadian visitors used to log in digital-resource platforms monthly to benefit from content shared by teachers and students. By May 2000, around half a million computers were connected to the web in Canadian schools.[11]

In December 2000, KPMG Consulting LP, was mandated by Industry Canada to draft an evaluation report on the SchoolNet 1 initiative (KPMG Consulting LP, 2000). The report raised eight issues that were meticulously investigated separately in the form of conclusions, background, findings and results from interviews and surveys. The eight issues are:

1. *Is this a legitimate activity and necessary role for the federal government?*

2. *Is there a continuing need for the federal government to invest in SchoolNet?*

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[11] For more information on SchoolNet, see http://www.thecanadianencyclopedia.ca/en/article/schoolnet/

3.  *What has been the impact of SchoolNet under the Computers for Schools programme on increasing the availability of computers for use in schools and libraries?*

4.  *What role has SchoolNet played in increasing connectedness among Canada's schools and libraries?*

5.  *What has been the role of the programme in providing educational resources?*

6.  *To what Extent has SchoolNet helped to address some of the main barriers to increased ICT use in schools and libraries?*

7.  *What has been the impact of SchoolNet on the availability of computers and on connectedness in First Nations Schools?*

8.  *What has been the role of the programme in promoting and facilitating collaboration between different participants both within the educational system, and with outside partners?*

While the overall conclusion plainly states that "*SchoolNet has played a strong role in establishing connectivity between Canadian schools and libraries*" regardless of the jurisdictional sensitivities and scarce resources, it saves no reserve to point out to several lacunae in the implementation process. The programme, according to the evaluators, managed to achieve an outstanding collaboration and leveraging; the federal role contributed to the realisation of a collaborative national vision; thanks to the programme, 100% of schools and libraries that had expressed their will to be connected to internet (over 200.000), were effectively connected. On the other hand, the report draws attention to the fact that many interviewed teachers and librarians expressed their need for a professional development in computer/ICT use; satellite programmes that provide on-line resources, namely LibraryNet, fell short of providing

cost-effective resources and meeting the engrossing expectations of learners, teachers and SN stakeholders.

Not long after receiving the report, SchoolNet issued an update for the Project-Based Collaborative Learning with Networked Computers guide in 2001 (Grégoire and Laferrière, 2001). The guide book provides a brief review of the approach and exhaustively presents the methods by which teachers can implement it using their networked computers for collaborative projects. After 2001, and after succeeding to realise the programme's mission, Industry Canada had to face the question "so what?". The following step was surprising to many as SchoolNet was terminated. The vision, however, continued to exist by means of peripheral programmes such as Computers for Schools, LibraryNet, First Nations SchoolNet, and Canada's Digital Collections. The decision is justified by the need to devote much focus on smaller programmes and more precise objectives.

In March 2005, Malatest & Associates Ltd. conducted a mid-term evaluation of First Nations SchoolNet Programme under the request of Industry Canada (Malatest, 2005). The programme may be considered the heir of SchoolNet as it contributed to funding connectivity, equipment, content development, software, and IT helpdesk services but on a smaller scale. The report falls in around 38 pages and is divided into seven sections. After explaining the methodology used pre and while conducting the evaluation, the report lists its findings concerning Industry Canada Staff themselves, coordinators of the Regional Management Organisation, school administrators and finishes with an overview of the case studies. The evaluation sets areas of investigation that make up the pillars of the programme and the process of evaluation as well including participation, management, delivery, impact and finally

challenges. The findings of the evaluation could be briefed in the following (Malatest, 2005).:

- *The FNS programme continues to be relevant and necessary*

- *Substantial progress has been made towards reaching the goals and objectives of the FNS programme.*

- *FNS has had the intended impact among schools, teachers, and learners.*

- *RMOs continue to be an efficient and effective method of programme delivery.*

- *Building local capacity was regarded as one of the most important factors governing the success of the FNS programme.*

- *Case studies revealed several innovative programmes have been created and supported through the FNS programme.*

The evaluation provides some recommendations relative to communication, resources, funding, partnerships, alignment of objectives and the methodology of programme delivery.

The final report on the First Nations SchoolNet Programme was undertaken in February 2009 by the Indian and Northern Affairs Canada. The summative evaluation involves an analysis of programme/ policy rationale and relevance; design and delivery; outcomes and success, and efficiency/cost effectiveness. *"The objectives of this evaluation are to determine whether the rationale for FNS remains relevant; whether the intended impacts are being achieved; whether the programme obtains value for money; and whether the programme is being delivered in a cost-effective manner."* (Indian and Northern Affairs Canada, 2009).

The evaluation finds at the level of relevance that FNS programme is highly consistent with the objectives of the Government of Canada (GOC) and Indian and Northern Affairs Canada (INAC). Also, it meets the longings of students in the First Nations schools and satisfies the connectivity needs of the communities. However, and most importantly, the evaluation addresses harsh criticism to the FNS as far as design and delivery are concerned. The evaluation states that the programme did not set clearly articulated programme objectives or outcome-specific performance measurement data. The FNS is founded on broad loose objectives that do not outline specific educational or societal goals to be achieved i.e. limited information is provided about what should be expected from the programme on the short run. The evaluation goes even further claiming that long-term performance measurement indicators and expected outcomes associated with FNS are inconsistent due to the abortion of two key studies which were expected to provide information about performance measurement (Indian and Northern Affairs Canada, 2009). Having stated all these design issues, the FNS continues to perform well at the level of success and cost effectiveness thanks to the commitment of all concerned parties and the seriousness dedicated to the execution of the programme.

In 2012, Computers For Schools (CFS), a subordinate SchoolNet programme, went through an evaluation process to assess its relevance and achieved results that should determine the potentials of programme renewal for 5 more years. CFS is a partnership-based programme that refurbishes surplus computers donated by the federal departments, local governments, private institutes and NGOs to the profit of schools, libraries and non-profit learning centres. The allocated budget does not exceed 45 million Canadian dollars; equivalent to 320 million dirhams over 5 years. The findings of the evaluation focus on two key elements, relevance and performance.

At the level of relevance, the evaluation concludes that the CFS made a great deal of difference at schools and proved to be capable of giving a second life to surplus computers in an environment friendly way. At the level of performance, the committee finds the CFS very successful as it offers reciprocal benefits to governments, the private sector and the general public. *These benefits outweigh the costs associated with the programme.* (Evaluation Committee of Science and Economic Department, 2012). The success according to the committee promises a renewal of the mandate for another 5-year term.

The programme was granted a prolongation for another 5-year mandate and was subject to evaluation in March 2017 by the audit and evaluation branch in the Ministry of Innovation, Science and Economic Development Canada. The evaluation incorporates for the first time a logic model that depicts the intended outputs and expected outcomes as instructed in the recommendations section in the 2012 evaluation report. Similar to its previous version, the 2017 evaluation remained faithful to the methodology based on the analysis of multiple lines of evidence as earlier stated, while the findings were focused on relevance and performance. At the level of relevance, CFS maintains its merit as a programme that aligns with the federal responsibilities to develop highly qualified students and citizens in ICTs while reducing the government's environmental footprint. At the level of performance, the programme managed to refurbish over 350.000 computers in five years and provided 1500 internships to young people seeking hands-on experience (Ministry of Innovation, Science and Economic Development Canada, 2017). Due to the fact that the logic model was submerged by loose goals, the evaluation was governed by the laws of quantitative investigation focusing on the number of reconditioned computers,

interns, tonnes of saved hardware, etc. Little or no data is provided about the qualitative added value of the process and how it improved learning in Canada.

## 4.2. Internal Evaluations by GENIE Directorate:

### 4.2.1. 2012 Evaluation Report

Until this paper is drafted, two internal evaluations have been carried out by the ministry of education represented by GENIE Directorate. The first took place in 2012/2013 and the second in 2014 at the request of Mr. Rachid Belmoukhtar, minister of education at the time. The evaluation examines the use of ICTE, management of apparatus in schools, early impact of ICTE use and the optimal technological solutions to be generalised. The significance of the evaluation stems from the fact that it is, as stated in the report, the first integral study that targets all regional academies and that question the use of GENIE technology by teachers, administrators and students as well. Although it was conducted past seven years of GENIE inauguration, GENIE directorate committed that there would be subsequent evaluations.

The data mining process was based on three different online questionnaires that target inspectors, school headmasters and teachers (GENIE, 2013). The inspectors' questionnaire comprised 24 items divided into four sections (technical-organisational, pedagogical, training and finally remarks and recommendations). The headmasters sheet contained 25 items divided on four sections (communicative, organisational-managerial, tracking and training). Teachers were surveyed by means of 27 items addressing four sections (communicative, technical-organisational, pedagogical and training). The study findings generally conclude that teachers' use of ICTE is optimal to a large extent; moreover, it highlights the added value of didactic tool kit in the classroom. The report raised eight red flag findings and recommendations (GENIE, 2013):

- The ongoing demand on the digital suite (a handy digital case for mini laptops with built-in chargers) makes it impossible to satisfy all teachers' needs.

- Hardware maintenance requires an allocation of funds

- Digital resources are not available in some subjects

- There is a need to provide interactive digital resources usable in different learning stages

- Some teachers are lacking the adequate training on how to use ICTE

- There is an urgent need for trainings accustomed to the level of teachers' pre-requisites

- Unplanned and increasing orders of apparatus perturbs the management of available hardware

- Use and maintenance of hardware has to be firmly scheduled and recorded

**4.2.2. 2014 Evaluation Report**

Not long after the release of the 2012/2013 report, the ministry launched a new assessment in 2014 following allegations of public money squandering [12]. In addition to inspectors, school head masters and teachers, the evaluation surveys, for the first time, students in accordance with the orientations and key indicators considered by the UNESCO (GENIE, 2015). The study tries also to evaluate ICTE implementation for all subjects at all levels, unlike the 2012 report restricted to the subjects that benefit from the available digital resources (Maths, Physics, Science and Amazigh).

At the level of form, the report comes, surprisingly, identical to the previous one to a large extent. Even the wording of study goals and relevance comes identical,

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[12] See Bakouch Aziz, "برنامج جيني: إهدار ملايين الدراهم على حواسيب معطلة", Al Ittihad Al Ichtiraki, 02 February,2013. Print.
See also "توضيحات بخصوص برنامج جيني لوزارة التربية الوطنية", Risalat Al Oumma, 22 January 2013. Print

which leaves room for a speculation that the evaluators were stressed out or had no

sufficient awareness of the critical political conditions that demanded and called for

this evaluation.[13]

| 2012/2013 report | 2014/2015 report |
|---|---|
| • *Diagnose the reality of ICT use;*<br>• *Diagnose the reality of hardware management in schools;*<br>• *Make a statement of the first impact of the use and integration of these didactic materials;*<br>• *Determine the most appropriate technological solutions.* | • *Diagnose the reality of ICT use;*<br>• *Diagnose the reality of hardware management in schools;*<br>• *Make a statement of the first impact of the use and integration of these didactic materials;*<br>• *Determine the most appropriate technological solutions.* |
| Table7: Comparison of study objectives in GENIE's 2012/2013 and 2014/2015 reports (Translation) | |

| 2012/2013 report | 2014/2015 report |
|---|---|
| • *It reflects the extent of use and integration of ICTE;*<br>• *It aims at identifying the difficulties encountered by educational actors;*<br>• *It will constitute a reference database for future evaluations;*<br>• *It offers a bank of reliable indicators that will allow project managers to refocus their action plans.* | • *It reflects the extent of use and integration of ICTE;*<br>• *It aims at identifying the difficulties encountered by educational actors;*<br>• *It will constitute a reference database for future evaluations;*<br>• *It offers a bank of reliable indicators that will allow project managers to refocus their action plans.* |
| Table 8: Comparison of study significance in the 2012/2013 and 2014/2015 reports (Translation) | |

Following the inconsistent findings and figures of the study[14], the rest of

report pages including the headmasters' recommendations as well as the committee

conclusion remained literally unchangeable. Below is a comparison of the study

conclusive remarks and recommendations

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13 See « وزارة التربية الوطنية تنفي توقيف تطبيق برنامج "جيني" وأنها بصدد وقفة تقييمية لإنجازاته », بلاغ توضيحي: pjd.ma, 08 April 2015

14 See the discussion chapter for more details

| 2012/2013 report | 2014/2015 report |
|---|---|
| *The study generally revealed the following* <br> • *The ongoing demand on the digital suite makes it impossible to satisfy all teachers' needs.* <br> • *The Need to give specific credit to the maintenance of tools and learning materials;* <br> • *Available digital resources do not cover all subjects and all levels;* <br> • *The Need for digital pedagogical resources that allow more opportunities for interaction with learners and that can be invested in various forms of learning activities (Introduction, Construction, Evaluation and Support);* <br> • *Some teachers lack training in the use of ICT teaching materials and their integration into teaching practices;* <br> • *There is a need for training that takes recognises teachers' cognitive differences in the use and integration of digital resources into an appropriate pedagogical scenario;* <br> • *The instant and unplanned requests (of ICT hardware), rise confusion due to this mismanagement of ICT tools;* <br> • *The Need to design a precise and detailed timetable for the use of ICT tools and develop a document for monitoring the various indicators and the maintenance of tools within the institutions* | *The study generally revealed the following* <br><br> • *The Need to give specific credit to the maintenance of tools and learning materials;* <br> • *Available digital resources do not cover all subjects and all levels;* <br> • *The Need for digital pedagogical resources that allow more opportunities for interaction with learners and that can be invested in various forms of learning activities (Introduction, Construction, Evaluation and Support);* <br> • *Some teachers lack training in the use of ICT teaching materials and their integration into teaching practices;* <br> • *There is a need for training that takes recognises teachers' cognitive differences in the use and integration of digital resources into an appropriate pedagogical scenario;* <br> • *The instant and unplanned requests (of ICT hardware), rise confusion due to this mismanagement of ICT tools;* <br> • *The Need to design a precise and detailed timetable for the use of ICT tools and develop a document for monitoring the various indicators and the maintenance of tools within the institutions* |

Table 9: Comparison of the remarks and recommendations' sections in the 2012/2013 and 2014/2015 reports. (Translation)

Although the report is based on feedback from all levels and all school subjects, the conclusions it ended up with remain unchangeable as the exploitation of results is not affected by any changes at the level of generated data. It is also noted that conducting two evaluations for the same programme less than two years apart is not common in the literature, which suggests that arbitrariness may have found its way into the process.

### 4.2.3. 2016 GENIE Conference Report in Agadir

In an open Education Day under the theme "Morocco OER Strategy Forum" organised by Cadi Ayyad University, Marrakech in 2016, GENIE directorate presented questionable statistics about GENIE and how it achieved progress over the preceding 10 years. Some key numbers, however, seem to be exaggerated, contradictory and defying to all the studies that refer to the programme's pitfalls, including official ones issued by the ministry and GENIE directorate itself (GENIE, 2016). Following are a few illustrations of these suspicious numbers.

| GENIE 2016 conference paper | Other concurrent reports |
|---|---|
| *"**100 %** (266 000) of the pedagogical staff received a training* by GENIE*"* (GENIE, 2016) | • *"82,6 % of inspectors reported that teachers find real **difficulties with the use and integration of ICT** in relation to the subject taught".* (GENIE, 2015)<br>• *There is a need for guidance on the pedagogical use of ICT* (GENIE, 2015) |
| *"**60%** of schools are connected to the Internet with filtering"* (GENIE, 2016) | • "The number of public schools in 2015/2016 is 10.756" (the Directorate of Strategy, Statistics, |

| | and Planning, Ministry of education, 2016) |
| | • "*To date, GENIE programme has linked 4,838 educational institutions to the Internet*" (Ministry of Education, 2016) |
| | • (4838 represent, back then, **only 44,97%** of Moroccan public schools. The difference is over **15%**) |
| *"Internal evaluations were carried out in 2012, 2014, 2015"* (GENIE, 2016) | • *Only two internal evaluations were conducted in 2012/2013 and 2014/2015* |
| Table 10: Comparison of GENIE progress report presented by GENIE in 2016 and concurrent official reports | |

Although the given numbers seem provocative to practitioners interviewed during the data collection phase, and are disproved when compared to other contesting studies, the author does not intend to make any accusations. Still, there is an eminent need to clarify the methods through which GENIE directorate generated these results.

## 4.3 Other Evaluation Reports

### 4.3.1. Fondation Maroc Numerique Report

In 2014, interesting, yet surprising, statistics were made public when the Fondation Maroc Numerique, a renowned non-profit apolitical association, issued a landmark brief evaluation on GENIE as a case study (Fondation Maroc Numerique, 2014). Following is the state of project progress that concerns all the projects launched under GENIE's auspices.
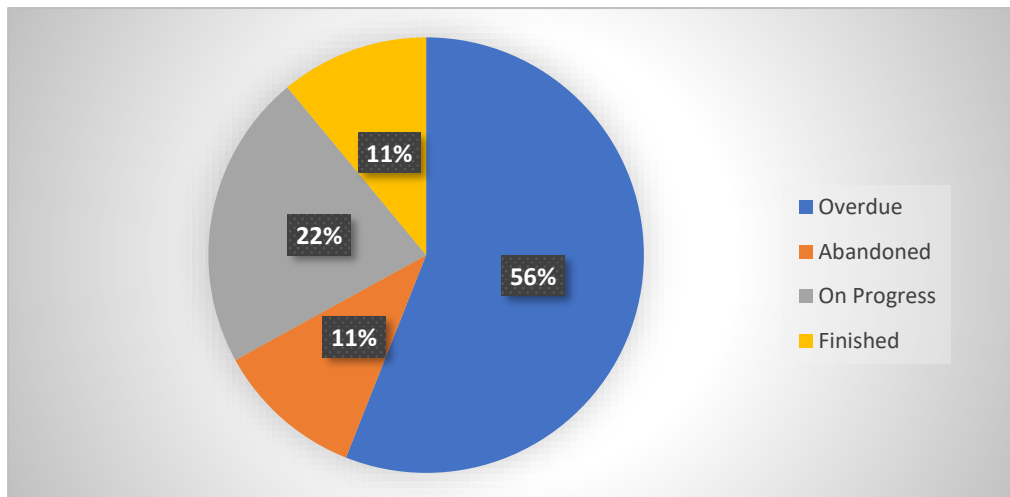
Figure 15: Progress rates of GENIE projetcts (Fondation Maroc Numerique)

This figure demonstrates that the rates of overdue and abandoned projects, which may be considered partial or complete failures, represent 67% of the overall projects. The report does not provide details on the causes that stand behind this setback, but it makes reference to the data sources that should be of pertinence, namely the Court of Accounts report of February 2014 and GENIE 2014.



Figure 16: Exploitation of ICT and multimedia rooms at school

While 85% of GENIE objectives relative to equipment were achieved, only 18% of multimedia rooms are exploited by teachers and students. The remaining 82% are either closed or not used at all due to different motives that will be elicited later in this paper. The report, in an attempt to provide a constructive evaluation, reiterates the need to 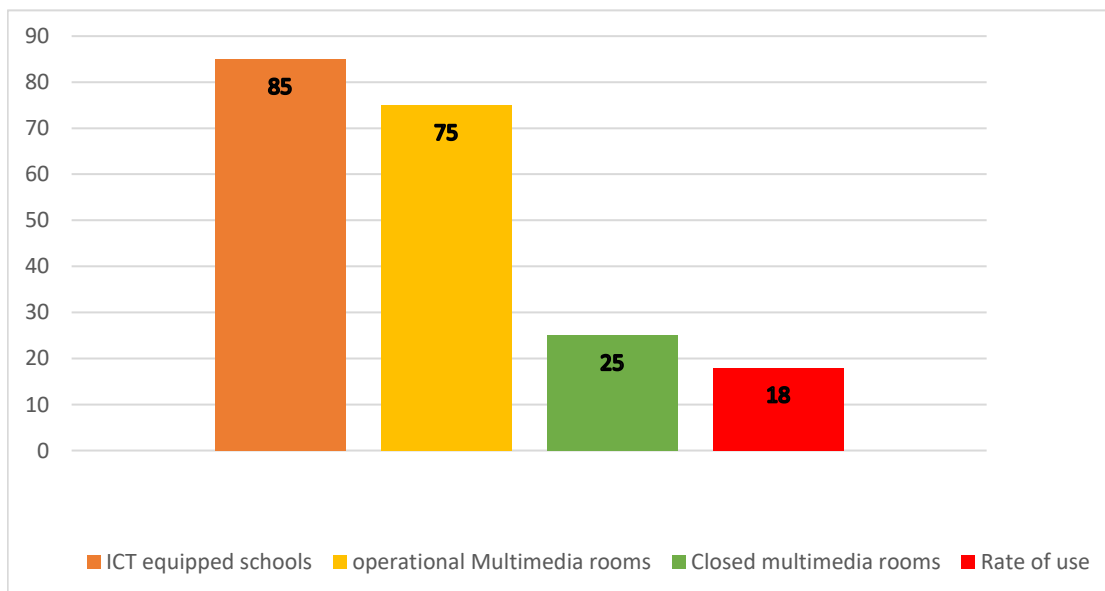adopt a strategy that balances the theoretical framework of change management with the need of teachers and students in real-life school environment. It, thus, calls for an elaboration of ICT-enriched classroom activities; the adoption of blended learning model; engaging students in alternative learning activities based on virtual interaction; and developing distance learning. As learning institutes possess different assets and challenges relative to the availability of technologies, budgets and staff (contingency variables), the report proposes the adoption of the contingency approach which promotes the implementation of diversified customised change management solutions. The graph below depicts the four stages of recommended strategic changes to be carried out depending on the contingency variables.
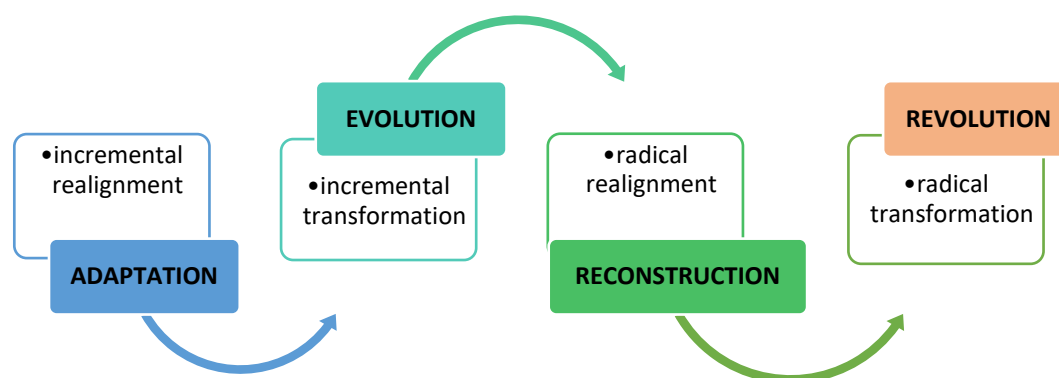


Figure 17: Types of strategic changes

Although the stages of intervention may seem linear and progressive, the action plan may not necessarily impose starting from level 1 (adaption) or stopping at level 4 (revolution). Certain conditions could require only one level of intervention

while others may require more depending on the gravity of conditions in the field. The report also recalls the stages of surviving a breakdown caused by the internal and external cultural barriers, dysfunctional non-cooperative actors and suggests remedial solutions. The report concludes that GENIE and the managerial board are experiencing the frog syndrome that is slowly enduring a serious menace without being able to perceive it until it is too late.

### 4.3.2. The Court of Accounts Reports

In a 2014 synthetic report conducted by the Court of Audit on Maroc Numeric and affiliated programmes, including GENIE and GENIE Sup, the report affirms that no prioritisation of any sort is attributed to any action plan or project. The report adds that the insufficiency of vision results in delays for GENIE-Sup when compared to Nafida or Injaz (Court of Audit, 2014).

In the 2014 annual report, the court dedicates a number of pages to the evaluation of GENIE in the form of observations that sought explanations from both GENIE directorate and the ministry of education. The report concluded that:

- It is a strategy with limited planning as far as equipment, networking, fund expenditures and exploitation.

- The weakness of synchronisation between actions: certain procedures were supposed to take place in harmony and synchrony with other actions to guarantee a smooth constructive succession of procedures, which did not happen. Certain Multimedia rooms remained inoperative due to the missing internet connectivity while the establishment of multimedia rooms in middle and high schools took place years after the target deadline.

- The lack of prioritisation of institutes: The equipment of educational institutes does not clearly follow an ascending or a descending pattern (primary/middle/high school).

- Limited visibility in the acquisition of digital resources: The acquisition of licenses of use (operating systems, word and data processing, security…) which drained considerable sums of money, was restricted by the number of present institutes and did not allow access to the source codes for future modifications or customisation for new schools.

- The lack of a hub network for the information system of education: There is no networking platform that would bring together students and teachers from different schools.

- Limited use of open-source applications: GENIE directorate instead opted for costly applications whose open source alternatives proved to be advantageous and used in many European and American countries.

- The health risk of WIFI at school: Many European countries, such as the UK, France, Germany, and Austria, have officially banned the use of WIFI at schools, and recommended using wired connection.

- Limited management of GENIE project: The multiplicity of the ministry stakeholders and affiliated institutes results in an overlap of missions where responsibilities are not clear, and coordination is often missing.

- Insufficiency of maintenance staff: Physical repair of hardware and software filtering seems to require more attention

- Low utilisation rates: The difference between the target hours of exploitation and the achieved ones is alarming (see the table above)

Despite the fact that this report in particular makes up the most salient reference document to present clear evidence that the programme undergoes serious failures, one may argue, from an academic standpoint, that it also has certain lacunas as well. The report, being a conclusive auditing document, investigates GENIE's utilitarian aspects of relevance such as rates of coverage and use, managerial issues, maintenance provisions, spending of allocations, etc.; it is an output-based report more than it is outcome-based. The report does not, for instance, inspect the teachers' reactions to the programme or the extent to which it may have improved the students' achievement. Further, the report, as its nature requires, is interested in getting answers from the governing bodies (the ministry and GENIE directorate) not first-hand users whose experience with the programme would provide an outright impact assessment of the programme.

### 4.3.3. Faouzia Messaoudi Case Study

One of the renowned studies conducted on e-learning engineering in Morocco is that of Faouzia MESSAOUDI (2013) within the framework of her PhD research. Faouzia's study may serve as an exhaustive outline of ICT use in Morocco that covers public and private institutes, strategies, programmes, challenges, etc. In her project, she examined GENIE *"that comes to concretise the national strategy to generalise ICT in education"* (Messaoudi, 2013). After reviewing the strengths of the programme as provided by GENIE directorate in terms of infrastructure, training, improvement of use and human resources leadership, Messaoudi cites 3 weaknesses:

- Lack of an effective communication plan;

- Lack of commitment by decision makers at the regional and local levels;

- Non-involvement of all pedagogical actors (namely teachers and superintendents)

She adds that certain factors may contribute to hindering the attainment of success including the disengagement of the actors in the field, the inefficiency caused by the dispersion of responsibilities, and the resistance of change by key actors. She concludes that the abundance of necessary resources is often obstructed by a slow ineffective use of material. The exhaustiveness of the study which may roughly be seen as covering everything about ICTE in Morocco might, however, be challenged and considered the pitfall of the study. Massaoudi, in an attempt to bring about a diagnosis of every aspect in relevance to ICT use in Morocco, her study summed up programmes, strategies and theories in few lines lacking depth and focus. Also, there is no second reading of the statistics provided by GENIE that require verification, although the obtained results are blurry and controversial if not mediocre as shown above.

### 4.3.4. KOICA and CITI Impact Assessments

Although the field of ICTE seemed tempting to scholars in Morocco over the past two decades, most studies on the impact and benefit of ICTE conducted in the Moroccan context are more theoretical, conjectural or based on the experience of other countries (El Mountassir Billah, 2008). However, a few studies published by research teams at Al Akhawayn University in Ifrane, Mohammed V University Agdal in Rabat, Sidi Mohamed Ben Abdellah University in Fez are very remarkable

In a three-year project sponsored by the Korean International Cooperation Agency KOICA agency, a team of 10 multinational experts, 6 technicians and 28 collaborating instructors set up a project that aims at increasing *the student performance, teacher involvement and appropriation of the ICT based approach* (Smith et al., 2009). The project, executed under the aegis of the Centre of Information Technology Innovation (CITI) hosted by the Al Akhawayn University in

Ifrane, aims at not only promoting the students' motivation, but also boosting their performance at school. The target population consists of 2 groups of middle school students from Fez and Ifrane who never received any ICT-based training or resources in Math, Physics and Science in an environment where ICT material is completely missing. The implementation process was undertaken over 3 stages; setting the scene: by providing an intensive training to instructors on the use of technology including image and video making, flash animations, interactive exercises, educational gaming, virtual experiments, etc; material development: by developing customised material within CITI labs to be used by the instructors; last but not least, using the material and comparing results with a control group that was instructed the traditional way (Smith et al., 2009).

The study revealed that ICT had "*a positive impact in enhancing student's learning and their performance in the biology and geology course in the three grades*" (El Asli, et al 2012). In Ifrane middle school, the obtained results were different as the performance of the experimental group was not much different from the control group during the first two years (middle school grades) but in the third, it enhanced notably. The experiment concluded that ICT has a positive impact on the student's achievement in Moroccan middle school, although it is not consistent across disciplines and middle school grades (Berrado et al, 2009) (El Asli, et al 2012). Although the experiment is unprecedented in terms of objectives, provisions and engaged experts, the study falls short of providing answers on the relevance of ICT to language classrooms. The study does not explain, hypothetically at least, how the social milieu in Ifrane affected the students' achievement, nor why the third-year results were different from the first and the second. It is also noted that the study, intentionally or unintentionally, ignored the human factor in charge of the

implementation process whose professional and personal qualifications are decisive to the success or failure of learning as whole.

Chapter V:

Methodology

In an effort to abide by the highest reliability and validity possible standards of evaluation, this study incorporates data generated using quantitative as well as qualitative approaches. Still, the nature of this evaluation, which calls into question the outdated routine assessment approach used by the ministry and mandated departments, dictated giving the qualitative approach more priority whenever possible. Therefore, the process of data collection and analysis were founded on the following:

## 5.1. Population of the study

The population of the surveys involves students and teachers who represent the bottom line of GENIE stakeholders whose success or failure closely reflects the worthiness of GENIE and related investments capable of realising an effective ICTE integration in Moroccan schools.

The teachers' sample population (N=249) could be divided into two major groups; teachers of scientific subjects (including Maths, Physics, Science, Technology and ICT), and teachers of foreign languages (French and particularly English). This can be justified by the fact that GENIE cannot be evaluated from a singular perspective that focuses on a singular subject matter and excludes others i.e. the programme may do well within the course of teaching a school subject as it may fail to deliver in others. Therefore, it is considered not fair to make it subject to evaluation and issue a value judgement based on evidence that overlooks some other critical details.

As for the students' questionnaires, the sample population (N=304) involves students from 4 public institutes of different critical variables: two high schools that speak for the urban and rural milieu located in Fez and the outskirts of Moulay Yakoub, in addition to two middle schools that represent both an under-privileged

area (placed in a precarious environment), and an upscale area (downtown) whose students have better accessibility to ICTE. Four classes have been chosen from the sample middle schools, and 6 others have been chosen from high schools. The levels range from grade 9 up to grade 12 (the second-year baccalaureate) and the host institutes are all equipped with GENIE multimedia room.

## 5.2. Data Collection Tools

- Teachers' questionnaires: The teachers were surveyed via web-based polling platforms, particularly Google Forms and Surveymonkey to ensure maximum outreach. As the participants are located in different areas of the country, the obtained data would reflect a holistic view of the programme's merit as well as the validity of ministerial releases in the work field. The initial questionnaire includes 23 questions that provide a rough preliminary idea about the participants' ICT practices in their schools; 6 items about their work milieu and experience and 17 items about their technology use. Later, it was decided to append a subordinate survey that concerns only teachers who took part in GENIE training courses both in English and Arabic. This questionnaire was devised and restricted by the guidelines provided in Kirkpatrick's, Stufflebeam's and Guskey's models and was administered by the same digital platforms.

- Students' questionnaires: students were interrogated by means of hard copy surveys that investigate their usage of ICT for educational purposes. Many questions are meant to detect areas of accordance and contradiction with the elements listed in the teachers' survey. A penultimate version of the questionnaire was tested beforehand with a group of 30 students. The procedure allowed the author to adjust and modify some questions before proceeding to the final version.

-       Key representative/informant via semi-structured interviews: They included teachers, students, GENIE training coaches, GENIE coordinators, representative of the National Centre for Educational Innovation and Experimentation. The semi-structured interviews were conducted in-person and via telephone prior to the survey so as to establish a start-up platform for the study. After the examination of surveys, another series of interviews was conducted in hope to find answers to some ambivalent findings. GENIE department representatives were approached during the analysis phase to ascertain findings and consolidate recommendations.

-       Content Analysis of documentation/literature/file review issued by the ministry, GENIE directorate, interested organisation and institutes, press and researchers.

## 5.3. Data Processing

-        The analytical process of feedback did not take advantage of all the retrieved data; only items that serve better the evaluation model were exploited.

-       The statistical analysis was performed using Microsoft Excel (bars and pies) and IBM SPSS (Statistical Package for the Social Sciences) V21.

-       As the nature of entries is qualitative on the first place, the functions used are correlation, standard deviation and index reference.

## 5.4. Evaluation Model

The above listed data collection tools were administered separately and independently, yet they all contribute to shaping a transposing view about GENIE. The idea was to customise an evaluation strategy based on Kirkpatrick's 4 levels model (reaction; learning; behaviour; results) in addition to Stufflebeam's CIPP model and Guskey's CPD. The CIPP and CPD would serve as rectification models

that should overcome Kirkpatrick's RLBR limitations. The choice of the models is based on their popularity and relevance as in a 1997, a survey conducted by the American Society for Training and Development (ASTD) concluded that 67% of human resources department (HDR) executives use the Kirkpatrick model in their internal evaluation (Jain 2014). According to the study, the process goes through the four levels in its entirety. Another study reported that 96% of companies resort to this model, or parts of it, at some point of training and development programmes (Bassi, et al, 1996, cited in Sharma, 2016). Being "the bible" of goal-based evaluation as described by specialists and scholars (Zinovieff and Rotem 2008), it is hard to overlook Kirkpatrick's model in this study or do without.

Among the popular, if not the best, rectifications proposed by concurrent evaluation models delineated in the previous chapter, are those advised by Daniel Stufflebeam (1971) in his CIPP model (context; input, process, product). Although the model was not as popular as Kirkpatrick's, CIPP's educational dimension gained the trust of many reputable academic institutions such as the U.S. Office of Education; the Southwest Regional Educational Laboratory in Austin, Texas; the National Centre for Vocational and Technical Education; the school districts in Columbus, Toledo, and Cincinnati, Ohio; Dallas, Forth Worth, Houston, and Austin, Texas; Saginaw, Detroit, and Lansing, Michigan (Stufflebeam, 1993) (Tamkin et al., 2002) (Stufflebeam and Coryn, 2014).

The CIPP model's utility in this study resides in its ability to project Kirkpatrick's within an educational framework. Furthermore, CIPP as a process-based model helps to improve the course of evaluation by providing guidance relative to the formative and procedural aspects of the programme. Once the programme comes to an end the same CIPP levels could be of use to conduct a post-realisation summative

assessment. The focus, accordingly, shifts from instructing what should be done into investigating what has been done.

Post the 2008 moratorium advised by GENIE directorate and drafted in collaboration with the NRTA, it is of paramount importance to examine whether the remedial adjustments and recommendations have had any impact over the course of execution. Particularly, we need to understand the effects of organisation and implementation environment to decide if they favour the adoption of new practices. Guskey's CPD model incorporates a particular evaluation (Organisational Support) that investigates the mechanisms, if there are any, by which organisations (the ministry of education and affiliated administrations) reinforce the retention and exploitation of newly acquired learnings.

As stated earlier, the nature of the study is academic and is not intended to audit the distribution of allocated funds. Although reference to the project budget is made occasionally, the return on investment does not fall within the scope of our research, giving us another reason to prioritise Guskey's CPD model over others such as Phillip's, Kearns and Miller's, and Hamblin's. CPD in the final fifth level tends to correlate learning objectives with learning outcomes to check the changes that have occurred thanks to the training at the level of knowledge, attitude, skills and behaviour. Should the ROI be of concern for interested parties, the CPD conclusions and recommendations may be still translated into value figures.

## 5.5. Adaptation of the RLBR, CIPP and CPD in the Study

The questionnaires, interviews and examined official circulars should provide answers to the following 6 integrated evaluation levels adopted from the three models stated above.

1. **Context:** at this level of evaluation, our focus will be placed on the start-up pre-existing conditions that have the potential either to sustain or endanger the inauguration of the project including assets, needs, allocations, institutes, training atmosphere, etc.

2. **Reaction:** This evaluation would gauge the teachers' impression about the ICTE training they received under the auspices of GENIE programme without referring to the training content. The evaluation allows room for a better and closer understanding of the conditions under which the training took place.

3. **Learning:** This evaluation inspects the content of cursus, what the teachers particularly have learned and what they think of its utility at school. We will look into the programme's official training courses, statistics and related sources of data

4. **Behaviour:** This component examines the potentials of new behaviours that may have taken place thanks to GENIE trainings.

5. **Organisational Support:** Because any behaviour change is conditional upon reinforcement, it is indispensable to examine the organisational support provided by the administration and how efficient it is. Direct testimonies of teachers, superintendents and students would be of much relevance.

6. **Outcomes:** Finally, we would see if the programme have had any impact on teachers and students being the ultimate target population or "customers" as Stufflebeam prefers to call them. The impact may have different shapes or forms and we would not prefer to focus on a single parameter.

## 5.6. Ethical and Academic Guidelines

The author wishes to declare that:

(i)     no support, financial or otherwise, has been received from any

organisation that may have an interest in the submitted work

(ii)    there are no other relationships or activities that could appear to have

influenced the submitted work.

(iii)   the names of participant interviewees and key informants are put upon

their clear consent.

(iv)    GENIE coaches and inspectors agreed to disclosing their initials only

(v)     names and personal information of teachers and students who agreed to

fill out the questionnaires remain strictly confidential and may not be

shared with a third party under any circumstances

Academically, the evaluation process was guided by Steele's key elements of

Evidence, Criteria, and Judgement (Steele 1970)[15]. To fulfil the evidence requirement

and be better qualified to wade into the venture of evaluating GENIE, the author

received nine-month graduate courses on classroom technology, e-learning pedagogy

and leadership from Drury University, Springfield Mo, USA. The selection of key

informants and interviewees is justified by the intensity of their interaction with ICT

and GENIE programme. The participant teachers in the survey were sent a call for

participation via the web pages of the Moroccan associations of English, French, ICT,

SVT, Physics and Math teachers on Facebook. As for the criteria, the interviewees

and surveyed participants were asked questions that address both macro and micro-

criteria depending on their status vis-à-vis GENIE programme. The conclusions of

micro-criteria presented by students and teachers were exploited in drafting macro-

criteria questions to key informants. Because this evaluation is not merely descriptive,

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[15] See Programme Evaluation in Key terms section

the author is compelled to provide judgements in the discussion chapter based on

statistics, reports, and witnesses of concerned parties.

# Chapter VI

# Results

This chapter is dedicated to the examination of study findings, with special focus on the factors that may promote or deter ICT use in the classroom in the light of guidelines presented by GENIE programme. The chapter outlines the study findings based on a customised model which consists of six evaluation levels: *context, reaction, learning, behaviour, organisational support,* and finally *Outcomes*. This model is conceived based on the impact evaluation models proposed by the renowned programme evaluation experts Daniel Kirkpatick, Daniel Stufflebeam and Thomas Gutskey whose contributions kept evolving for decades until their latest updates in 2016, 2017, and 2014 respectively. This chapter will address each level at a time by providing results of pertinence (to each level) from the questionnaires, interviews and related reference documents. While processing the results that bear a quantitative nature, the author tries to address key elements such as the explanation of scoring (how statistics were scored/scaled), descriptive statistics (the feedback of the population), and inferential statistics (providing context information about the chosen sample). Quantitative data is presented to endorse, explain and supplement these findings.

## 6.1. The Demographic Sample

The sample population of participating teachers consists of 249 random teachers working full-time in public sector. Following is preliminary data which may help sketch the characteristics of the sample population:

Of the total sample (N= 249), 150 teachers work in urban areas while 99 others work in rural areas. Most of them are located in eight northern regional academies from Sous Massa Daraa up to the Eastern Region.

| Work Milieu | *f* | Percent |
|---|---|---|
| Urban | 150 | 60% |
| Rural | 99 | 40% |

Table 11: work milieu of participants

The majority of participants have been serving between 10 to 15 years, which is consistent with the demographic makeup of the ministry's staff as mentioned in the 2015/2016 ministerial census

| Category | *f* | Percent |
|---|---|---|
| 5 or less | 51 | 20.5% |
| 6 to 10 | 51 | 20.5% |
| 11 to 15 | 102 | 41% |
| 16 or more | 45 | 18% |

Table 12: Work experience of participants

The population of participants consists of teachers from different disciplines, the sweeping majority of which are language teachers especially English, in addition to scientific fields (MPSC) and a few other subjects.

| Discipline | *f* | Percent |
|---|---|---|
| Languages | 147 | 59% |
| MPSC | 67 | 27% |
| Other | 35 | 14% |

Table 13: Teaching discipline of participants

The participants who were interested in taking part in the study are either high school teachers or middle school teachers. Primary schools were excluded as the study examines how the programme succeeds or fails in each school discipline and such scope is missing at the primary level.

| Level | *f* | Percent |
|---|---|---|
| *High school* | *129* | *52%* |
| *Middle school* | *120* | *48%* |

Table 14: Participating institutes

As for gender, two thirds of participants are male while the rest are females. Although the finding inevitably raises the question of "why?", it remains consistent with the demographic fabric of the ministry where the number of male teachers in high schools is 32544 versus 16736 females or even 31702 male teachers in middle schools versus 21931 female teachers.

| Gender | *f* | Percent |
|---|---|---|
| *Male* | *169* | *68%* |
| *Female* | *80* | *32%* |

Table 15: gender of participants



Figure18: Ministerial Vs our study gender statistics

A simple comparison of the ministerial official statistics on teachers' gender with our statistics reveals a relative consistency at the level of representation.

As for the students' population, 304 students from 4 middle schools and high schools took part in this study. The elicited results were often compared to those provided by teachers for the sake of confirmation, transposition or mere analogy.
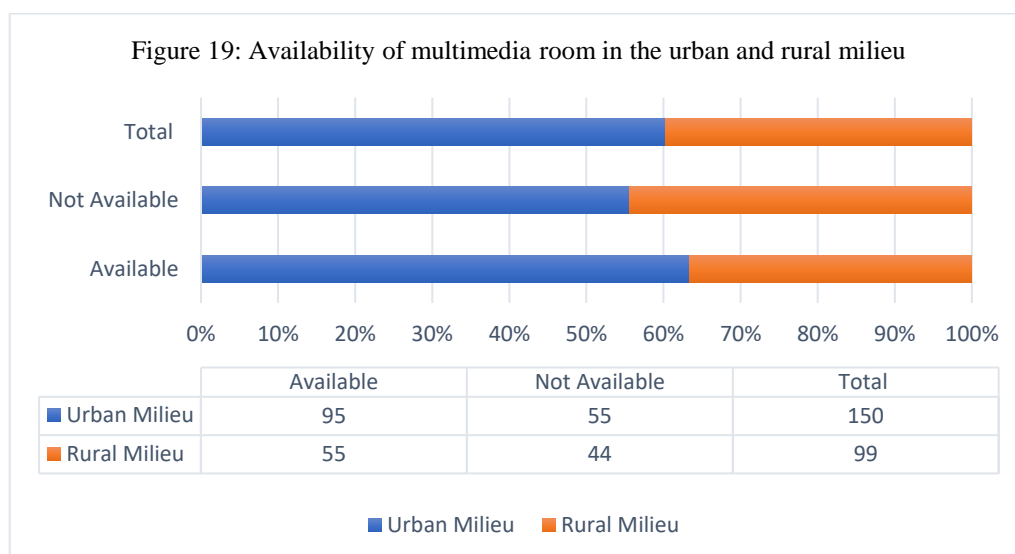
As the students' sample represents four public schools and divided on ten classes between grade 9 and grade 12, it reflects the students' accumulative experience with a big number of teachers that ranges between 30 teachers for middle school students and 60 for high school students for each class. This is due to the fact that each year a class is instructed by almost 10 teachers, so by the time a student reaches the baccalaureate level, they should have attended the classes of approximately 60 teachers. In other words, each one of our classes communicates their experiences with 30 to 60 teachers who according to GENIE's "alleged" statistics have all taken part in a training course (GENIE, 2016).

**6.2. The Six Levels of Evaluation**

**6.2.1. Context:**

This evaluation will look into the pre-existing conditions such as needs, problems, human resources, opportunities and dynamics that influence, for better or worse, establishing an information society within educational settings. At this level, it is not intended to examine the pre-existing conditions before GENIE was launched in terms of apparatus and training, but rather study the factors that should ultimately lead either to success or failure to meet the programme's ends.

One of GENIE's top priorities since its inauguration was to grant students and researchers a wider access to ICTs by generalising multimedia rooms in every Moroccan school and university. The programme's initial goal was to cover 8604 schools and 13000 satellite schools. Our survey concluded that the MMR is available in 63% of urban schools and 56% of rural schools; hence, students in urban areas have a slightly better chance to have access to technology compared to those in rural areas. On the other hand, it is worth reminding that these proportions concern only the surveyed sample not all the educational institutes in the country where the multimedia room coverage approaches 40%.



Figure 19: Availability of multimedia room in the urban and rural milieu

| | Available | Not Available | Total |
|---|---|---|---|
| Urban Milieu | 95 | 55 | 150 |
| Rural Milieu | 55 | 44 | 99 |

Urban Milieu    Rural Milieu

Taking into account that multimedia rooms are dedicated to students and teachers regardless of the subject being taught, and are supposed to be independent from ICT classrooms, 95% of these multimedia rooms (N=150) are surprisingly used as ICT classrooms to teach solely computer studies. Therefore, only ICT teachers are allowed into them.

| ICT /multimedia room | f | Percent |
|---|---|---|
| The same | 143 | 95% |
| Not the same | 7 | 5% |

Table 16: Multimedia room Vs ICT room

Even when the MMR is available, Language and MSP teachers express their reluctance to use it in more than 87% of cases.



Figure 20: Teacher's use of MMR
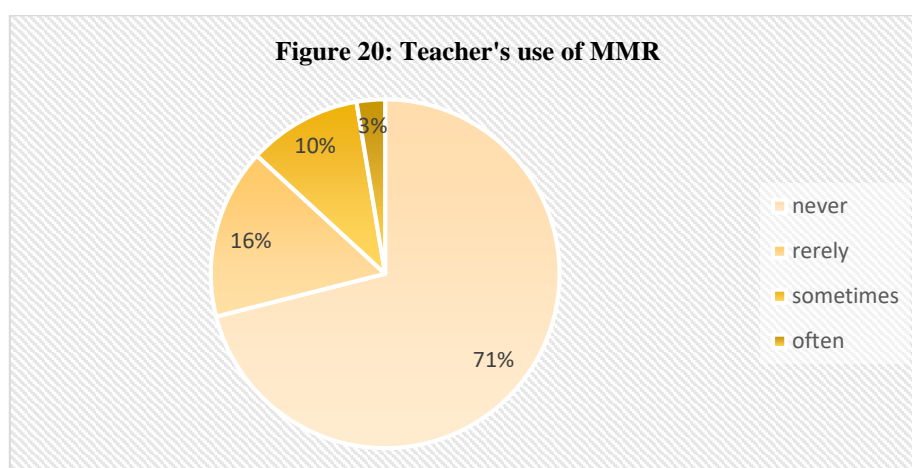
This massive disuse might be explained by the fact that language and MPS teachers are lacking the official soft resources that should make the hardware of utility, especially when the computers are not connected to internet. Only 28% of interviewees whose institutes possess an MMR confirmed the abundance of internet onsite, while 72% of other institutes do not enjoy the privilege of internet accessibility.

As M-learning may represent a widely recognised substitute to conventional E-learning methods, we surveyed the availability of mobile phones for students.

Table 17. Q: Do you have a smart phone? (students' survey)

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
|  | No | 64 | 21.1 | 21.1 | 21.1 |
| Valid | Yes | 240 | 78.9 | 78.9 | 100.0 |
|  | Total | 304 | 100.0 | 100.0 |  |

Later, the teachers were surveyed about their attitude towards the use of their smart phones for educational purposes in the classroom. As far as the pedagogical utility of mobile gadgets, the results are divergent and imply a sort of reluctance and apprehension.

Table 18. Q: Do you use your mobile phone for educational purposes in the classroom? (teachers' survey)

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
|  | never | 40 | 16 | 16 | 16 |
|  | rarely | 48 | 19,0 | 19,0 | 35 |
|  | sometimes | 91 | 37 | 36 | 71 |
| Valid | often | 43 | 17 | 17 | 88 |
|  | always | 27 | 11 | 11 | 100,0 |
|  | Total | 249 | 100,0 | 100,0 |  |

Further, 62% of our sample interviewees added that they never allow students to use their mobile phones for educational motives in the classroom, whereas only 4% frequently allow this practice. To justify the ban, teachers listed fear of distraction and difficulty to monitor the students' activity on the net as the most salient reasons why they prefer not to opt for this alternative.

**6.2.2. Reaction**

In the reaction evaluation, Teachers' impressions are being gauged with reference to the ICTE training they received by GENIE programme. The reaction evaluation, as stated earlier in the literature chapter, inspects the conditions under which the training took place including the setting (place and time), the coach, the material, etc. that either favoured maximising the learning outcomes or made them

hard to achieve. The generated data is essential in the overall assessment of the programme, especially when the training is a part of training series that will take place several times with other groups of trainees. When negative feedback is given about a training component such as the coach, the methods or the material used, prompt reaction is required from the organisation that administer the programme to alleviate any potential breakdown of the whole process. As the purpose of reaction evaluation in our study is summative not diagnostic, we try to identify factors that contributed to rendering the programme either successful or failure. Content of the training courses, however, will not be examined until the next level.

Opposite to the statistics provided by GENIE directorate (2016) claiming that 100% of the ministry's personnel received a training on ICT under GENIE auspices, only 33% of our population confirmed receiving such a training, and they were kindly requested to fill out an annexed GENIE survey. This population is placed in different academies and their trainings took place between 2006 and 2017; therefore, it is assumed that they have different experiences and divergent views by virtue of presumable improvement that has taken place over 12 years and also the different training conditions insured by the academies.

The teachers (N=83) were initially asked to evaluate on a scale from 1 to 5 the conditions of the training. 1 represents lack of satisfaction and 5 stands for high satisfaction level.
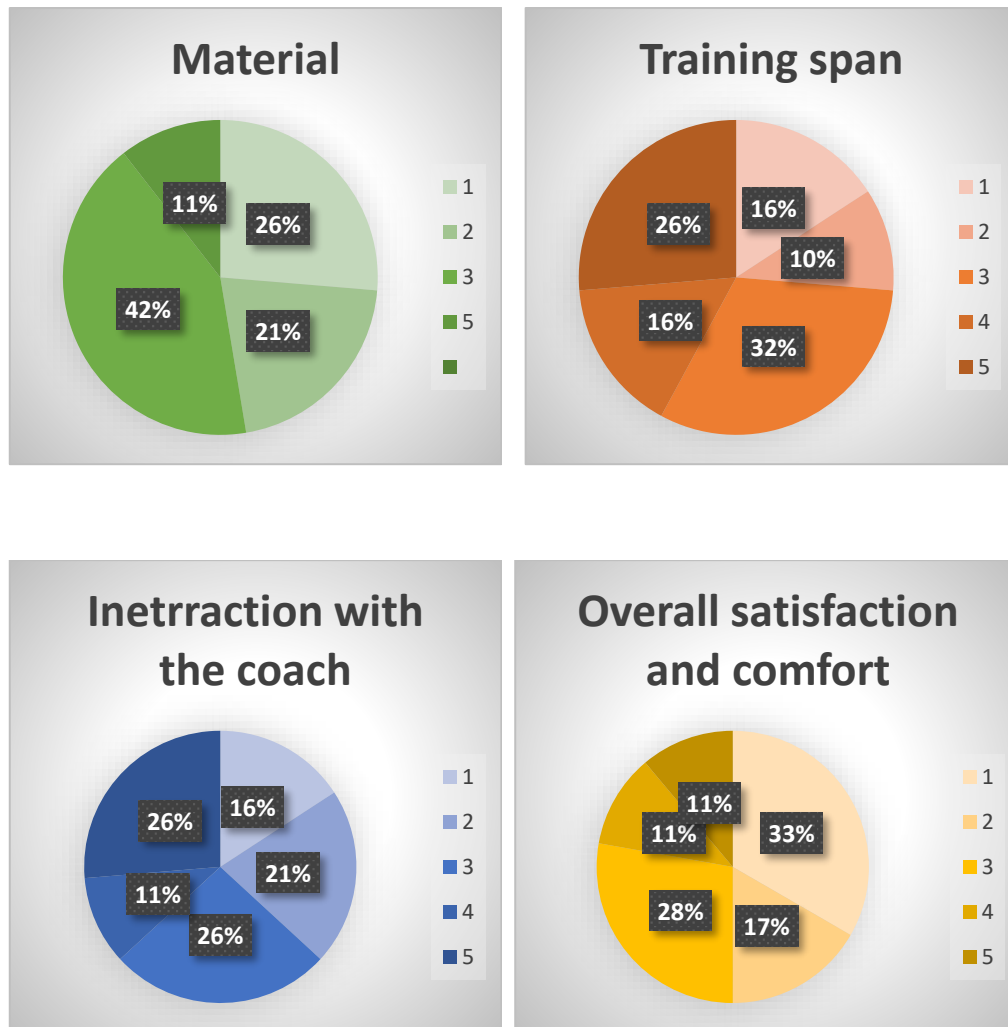
Figure 21: Teachers' first impression about GENIE training

While 47% of participants show discontent with the available material, 53% are either partially or completely satisfied with what has been available for them. At the level of time allotted to the training course, only 26% think it was not enough. 74% are partially or completely satisfied and think it was sufficient. As the interpersonal factor is decisive in such a process, 37% think that the interaction with the coach was not optimal, while 63% remain positive about it either partially or completely. The overall satisfaction rate reveals that 50% of participants are not satisfied with the training while the 50% others are partially or completely satisfied.

As the satisfaction rate does not exceed 50% of N, it is by no means an indicator of success since the other half's dissatisfaction may jeopardise any potential learning.

While working on the calculations, the author has been aware of the fact that the satisfaction proportional rate may conflict with the index reference, such as the case of five participants giving only 1 point for a certain variable like material against five other participants giving it 5. On a proportional scale, the result would be interpreted as 50% of participants are satisfied against 50% who are not, which is a draw. But on an index reference scale, the variable would get 3/5 or ((5*5) + (5*1) / N) = 30/10 = 3, which is a positive non-neutral index mark. In this study, both methods were used, and they proved to be harmonious on the proportional as well as the index reference scales.

| | Satisfied | Unsatisfied | Index reference |
|---|---|---|---|
| Material | 53% | 47% | **2.63** |
| Training Span | 74% | 26% | **3.26** |
| Interaction with the Coach | 63% | 37% | **3.10** |
| Overall Experience | 50% | 50% | 2.47 |
| **Total** | **60%** | **40%** | 2.86 |

Table19: Index Reference of Satisfaction

Regardless of the training outcomes, the vast majority of teachers seemed to be positive about the experience and expressed their readiness to take part in similar ones again if needed. To justify their choices, teachers mentioned "the need to stay updated with recent findings in the field, the need to improve one's capabilities and finally being compelled to take such trainings (ICT teachers).
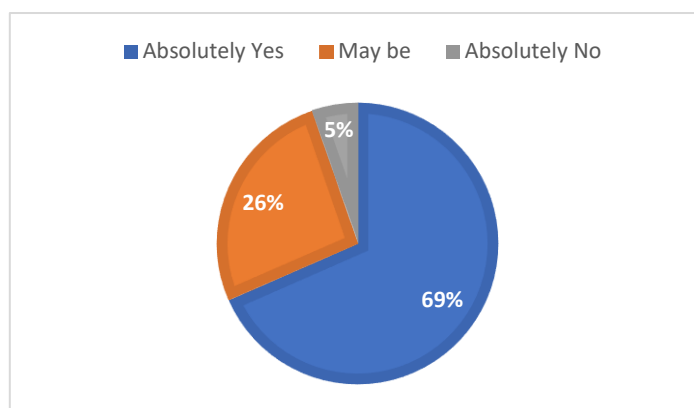
Figure 22: Readiness to re-participate in ICT trainings

89% of the teachers who seemed aware of the relevance of ICT to teaching and learning recommend this course to their fellow teachers.

## 6.2.3. Learning:

This part of our evaluation is meant to make sure that the participants have successfully acquired the target knowledge and skills set by the ministry represented by GENIE directorate. The significance of conducting a learning/input evaluation lays in the fact that it verifies the content, format, and organisation of work to make sure the process aligns with the target goals of the governing body.

Officially, the training is to occur via two stages; the first is a common core module that concerns teachers, headmasters and inspectors, and the second is a special module dedicated to each of three categories of actors. The official course guidebook, conceived by a team of experts from ALEF, USAID, Microsoft, and UNESCO, reiterates the programme's mission and approaches and provides a full description of the training courses. Following is a briefing of the modules and workshops

| General objective | Workshops | Time | Workshops Objectives |
|---|---|---|---|
| Mobilising core actors: inspectors, | ICT and Professional improvement | 3 hours | • **Sensitise the participants of the** |

| headmasters and teachers and involving them in the process of implementing GENIE programme as a mechanism to integrate ICT in education | ICT and developing access to information | 3 hours | importance of technical and methodological approach for the integration of ICT in education. |
| | ICT, educational content and Openness to the outer perimeter | 3 hours | • **Accompany the use of this technology for educational and administrative purposes.** |
| | ICT and establishing the culture of sharing | 3 hours | • **Managing the "change" associated with the renewal.** • **Make the integration of this technology a local responsibility.** |

Table 20: Primary Common Core Module (translation)

After setting up the scene, each group of collaborators is to take a customised training course that meets their special needs. Following is the teacher's syllabus.

| General objective | module | time | workshop |
|---|---|---|---|
| To Enable teachers to use and develop these techniques and get them integrated into their classroom practice | Digital resources | 12 hours | **Identification and assessment of pedagogical digital resources** |
| | | | **finding digital resources and adapting them to learning scenarios** |
| | | | **Systematic integration of digital resources in the classroom practice** |
| | Communication and ICT | 6 hours | **Communication in the school milieu** |
| | | | **Communication services used in the school milieu** |
| | | | **Educational uses of blogs** |

| | ICT and the improvement of professional performance | 6 hours | **Practice groups and improvement of professional performance** |
|---|---|---|---|
| | | | **Companionship for a pedagogical use of the multimedia room** |

<div align="center">

**Table 21: Special Module Dedicated to Teachers (translation)**

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When asked to self-evaluate their command of ICTE skills, 95% of participants who took part in GENIE training courses stated that they have the necessary savoir-faire to manage their ICTE requirements. Only 5% think that they do not feel at ease handling technology in the classroom.
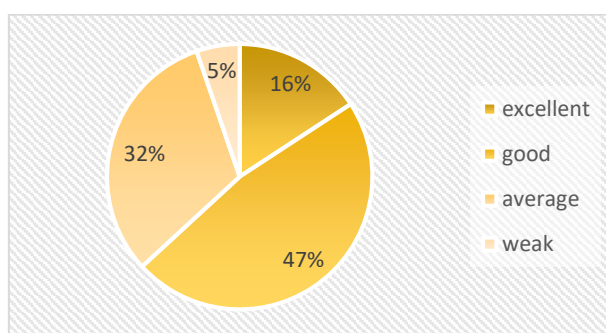


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Figure 23: Teachers' command of ICTE

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This finding is reassuring and may serve as a solid background for any subsequent training where self-efficacy is highlighted. Surprisingly, the story of the training in the field was completely different and alarming. Teachers, regardless of the school subject they teach, receive the same kind of training that is most likely about Microsoft Word, Excel and Power Point. Some English and Maths teachers who have been interviewed on this point often raised the question "what is this about and what is in it for us?". They think that a training on word processing programmes is not much appealing to their classroom needs and does not respond to the specificity of the subject they teach. They also think that the curriculum is vague, more theoretical and

confusing even for coaches who end up instructing on Microsoft Office software rather than conventional ICTE. Only recently, GENIE's attention has been drawn to the issue and some training courses have been shifted towards educational software like Hot Potato and Scratch.
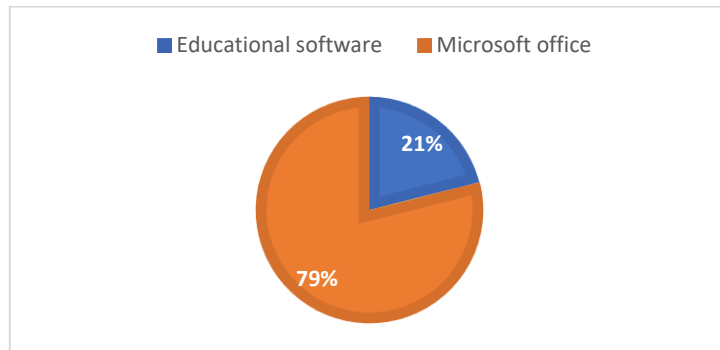
Figure 24: Content of Training Course

As a result of this predilection for Microsoft products, only 20% of participants feel that the training course contributed to improving their competencies. Also, the majority of the population think that their command of technology did not dramatically improve thanks to the training.
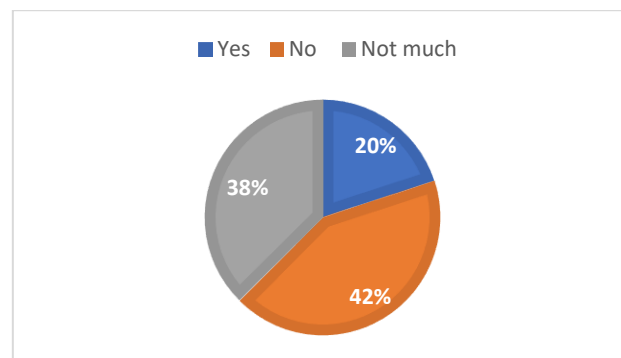
Figure 25: Q. Did GENIE training course have a strong impact on you?

To understand why they think so, teachers were asked if the content is new and innovative to them. Only 21% found the material fully meeting their expectations.
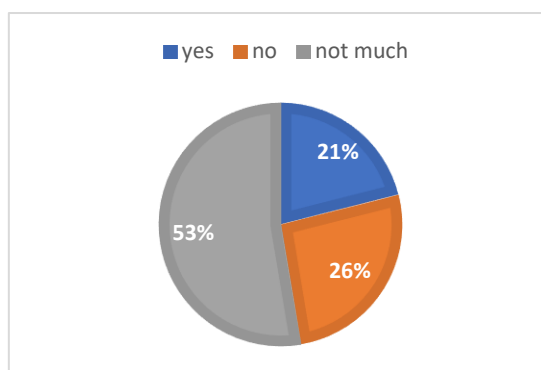
Figure 26: Innovation of content from teachers' perspective

To value the worthiness of content for classroom needs, teachers, including GENIE alumni, were asked if the training helped them in the classroom or made their tasks any different. 57% of the participants think that the process had very little or no impact at all on their classroom practice. 31% think that the utility of training was limited or not efficient enough. 12% think that the training impacted positively their savoir-fair in the classroom as the table below shows.

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| valid | useless | 37 | 46 | 46 | 46 |
| | weak | 9 | 11 | 11 | 57 |
| | average | 25 | 31 | 31 | 88 |
| | useful | 5 | 6 | 6 | 94 |
| | v. useful | 5 | 6 | 6 | 100 |
| | **Total** | **81** | **100,0** | **100,0** | |

Table 22: Relevance of training to teachers in the classroom

On an index reference scale, the relevance of content to the classroom needs barely scored 2,16/5. During the course of interviews, teachers asserted that the training is beneficial to those with limited ICTE skills who endure hardship while typing their quizzes or grading their students' sheets.

**6.2.4. Behaviour:**

GENIE via its professional trainings put a strong bid on making change and establishing a new ICT culture in the Moroccan classrooms. These trainings, by the same token, will be counterproductive if they fail to translate into action and motivate teachers to adopt new teaching techniques based on ICTE. This part of our study examines the new behaviours, if there are any, that may have taken place thanks to GENIE.

Initially, it is obviously imperative to verify the impact of GENIE courses on the teachers' motivation to use technology in their classrooms. Teachers who have never participated in any GENIE trainings have been asked how often they use technology in the classroom and their answers were compared to those of GENIE alumni using the statistical standard deviation technique. ICT and Technology teachers have been exonerated from answering the question given that they work full time with technology.
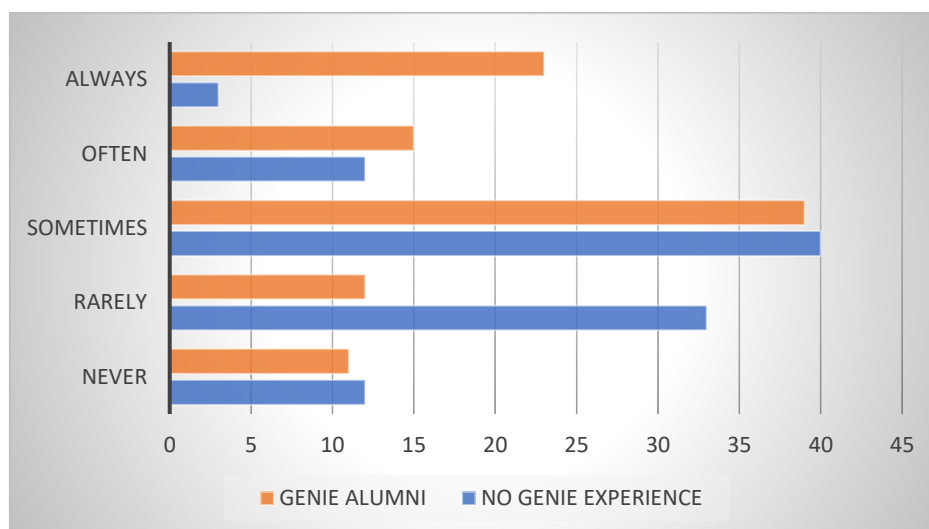


Figure 27. Q: Do you use technology in your classroom? (e.g. your PC)

Although the results reveal a considerable amount of reluctance to use technology for different reasons, they still come in favour of GENIE alumni who have more predispositions to use technology when the material is at disposal. 23% of

GENIE alumni claim that they always use technology in their classrooms versus 3% of teachers with no previous experience with GENIE trainings. 33% of teachers who rarely use technology are those who never took GENIE courses versus 12% of GENIE alumni. Based on these statistics, the standard deviation analysis shows that GENIE alumni have not only a higher mean, but also a higher standard deviation. In other words, both the frequency of technology use and the number of active users are significantly higher after GENIE trainings.

**Standard Deviation**

|  | N(%) | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Mass teachers | 100 | 1 | 5 | 2.6100 | .95235 |
| GENIE alumni | 100 | 1 | 5 | 3.2700 | 1.25412 |
| Valid N (listwise) | 100 |  |  |  |  |

Table 23. Q: Do you use technology in your classroom?

Participants were told to justify why or why not they use technology. Those who answered with "yes" mentioned economy (of time/effort) and motivation of students as the principal drives to use technology in the classroom. However, all those who answered with "no" mentioned the lack of material as the most important motive why they do not use technology in their classrooms. Answers provided by ICT and Technology teachers were entirely disregarded.

Teachers who never took part in GENIE trainings, except ICT and Technology teachers, have been asked if they think technology is a must in the classroom. 86% think that it is indispensable.
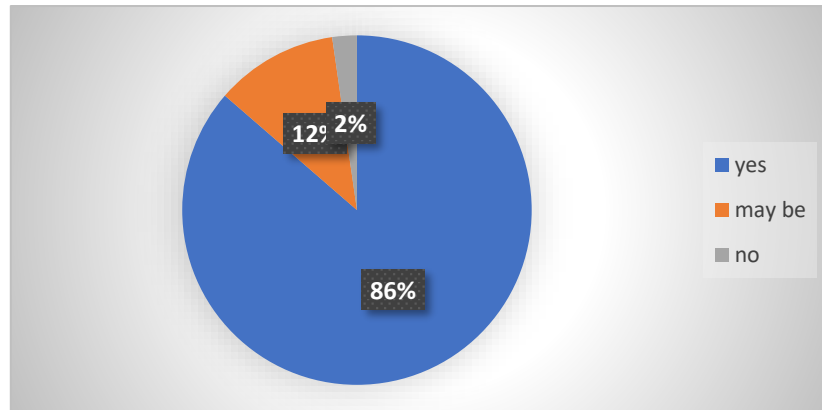
Figure 28. Q: Do you think technology is a must in today's classroom?

These results have been compared to the ones obtained from GENIE alumni
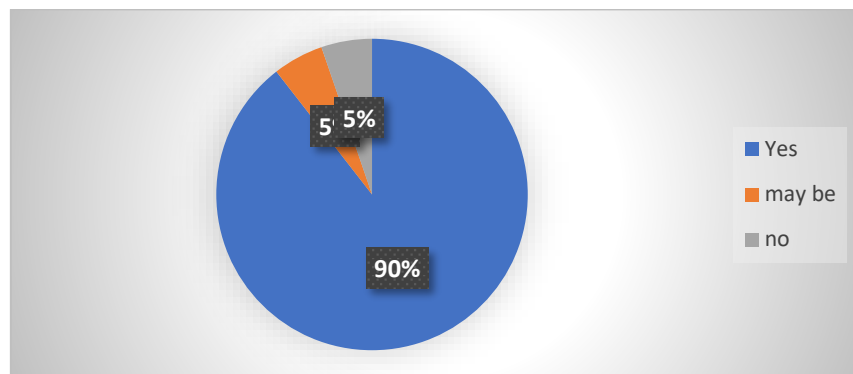


Figure 29. Q: Do you think technology is a must in today's classroom? (GENIE alumni)

Although GENIE alumni demonstrated more positive attitude towards the relevance of ICT in the classroom from their own perspective, the statistical analysis does not reveal a sharply significant standard deviation.

When asked if GENIE training changed their attitude towards ICT in the classroom, most participants think that the course did not.

Figure 30. Q: Did GENIE change your attitude towards ICT in the classroom?

The answers imply that positivity and awareness vis-à-vis the relevance of ICT to the modern classroom are rather innate, but they are challenged by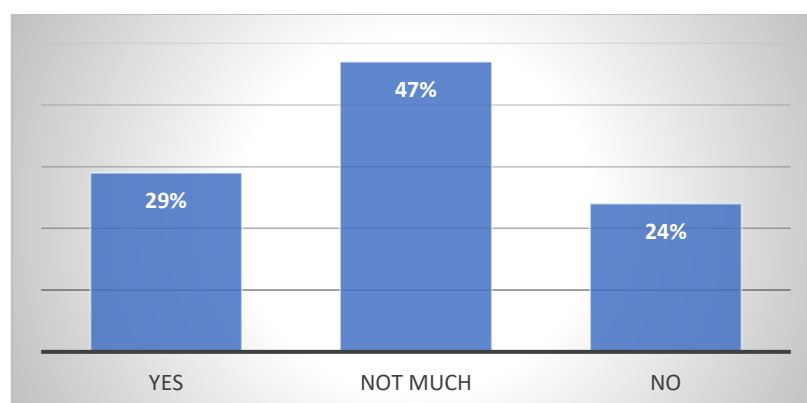 an acute shortage of material and almost a systematic misuse of MMRs when available. GENIE alumni were asked if they exploit alternative solutions like m-learning. 43% of the answers were plainly negative, while 57% of the answers range between occasional and frequent use of mobile gadgets.
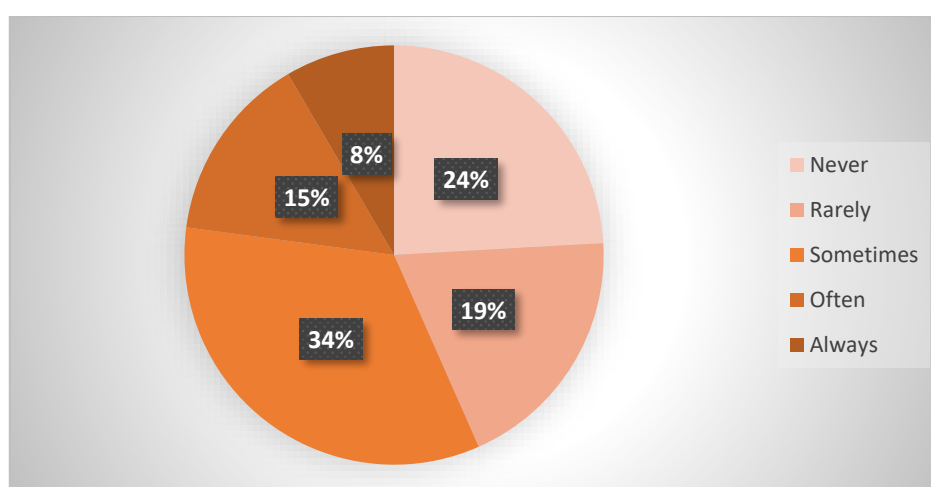


Figure 31. Q: Do you use mobile gadgets (tablets, smartphone…) in your classroom (GENIE alumni)?

The results reveal that the number of alumni who never use mobile gadgets approximates the number of those who frequently do. These answers were translated into an index reference scale and compared with those obtained by mass teachers who never participated in GENIE. The approximate figures, that were generally positive for both parties, favour the hypothesis that GENIE did not have any influence on trainees in this particular perspective.[16]

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[16] Mass teachers scored 65% of occasional or frequent use Vs 57% for GENIE alumni

**Standard Deviation**

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| GENIE alumni | 83 | 1 | 5 | 2.79 | 1.273 |
| Mass teachers | 166 | 1 | 5 | 2.86 | 1.231 |
| Valid N (listwise) | 83 | | | | |

Table 24. Use of mobile gadgets in the classroom

As the m-learning model requires an involvement of both the teacher and the student, GENIE alumni were asked about their reaction towards their students' use of mobile gadgets in the classroom for educational purposes.
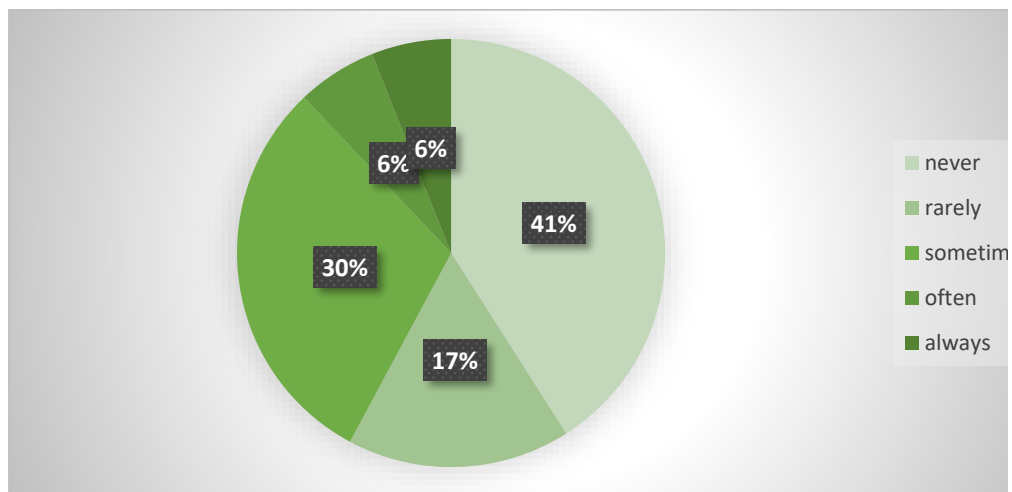


Figure 32. Q: Do you allow students to use mobile gadgets in the classroom (educational purposes only)?

The results obtained reveal a strong reluctance to trust m-learning as an alternative to the conventional ICTE methods. A standard deviation analysis where these results are compared to those obtained by mass teachers reveals that mass teachers are slightly more reluctant to adopt m-learning model as the table below shows

**Standard Deviation**

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| GENIE alumni | 83 | 1 | 5 | 2.16 | 1.214 |
| Mass teachers | 166 | 1 | 5 | 2.14 | 1.037 |
| Valid N (listwise) | 83 | | | | |

Table 25. Q: Are your students allowed to use their mobile gadgets?

Knowing that the new trends of teaching focus on the improvement of extended competencies, project-based learning and inverted classroom as techniques that foster self-efficacy and active participation of students in the process of learning, digital resources are becoming such an indispensable material for today's classroom. The web portal launched by the MKTC is the official GENIE platform that provides educational digital resources for teachers and their students who may take advantage of it at school or at home.

Below is an example of the listed resources dedicated to the 2nd year baccalaureate students who might find it of utility only if they are scientific-branch affiliates. For instance, only 1 piece of material is available in English versus 94 in Physics, Science and Maths, even though English is mandatory for all terminal baccalaureate students in all streams.



Digital resources available for 2nd Baccalaureate students all streams
Source: http://www.taalimtice.ma/rn/%D9%85%D9%88%D8%A7%D8%B1%D8%AF-
%D8%AD%D8%B1%D8%A9. Retrieved 12 Aug 2018.

Ironically, that one available material, which is certified by v@ren in 2018, the official accreditation committee, is nothing but a YouTube video for grade 9 students that explains the present simple. Even worse, lots of resources, that are supposedly available to students and teachers, are protected by a username and a password that are not at the hand of all teachers. The take-away DVD might be a solution for teachers working in off-line mode due to the lack of internet, but the material is entirely dominated by scientific subjects and contains PDF activities that seem to lack the prestige of "real" digital resources.

Students were asked if they visit the ministry websites including taalimtice and the results came as follows

Table 25. Q: Do you visit the ministry educational websites?

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 270 | 88.8 | 88.8 | 88.8 |
|  | Yes | 34 | 11.2 | 11.2 | 100.0 |
|  | Total | 304 | 100.0 | 100.0 |  |

### 6.2.5. Organisational Support

The relevance of this stage of evaluation resides in the fact that such support can either internalise or jeopardise the newly acquired behaviours. As stated earlier in the literature review, it may not be easy to abandon old routines and trade them for new ones; once learning has taken place, the organisation is under the obligation to reinforce and constantly favour new behaviours.

This section of the evaluation synthesises a transposing overview of disruptive factors related to organisation support that hinder headmasters, teachers and coaches from achieving optimal results. These findings are primarily generated from direct

interviews with teachers, school headmasters and other officials, yet part of these findings comes from the additional comment section in the questionnaires. The results are followed by an analysis of Change Management issues that do not help in the process.

Opposite to an official GENIE bulletin (2016), not all headmasters benefited from ICT trainings; consequently, it is not hard to pinpoint the enormous issues that many headmasters, consciously or unconsciously, go through. Following are the most recurrent problems that have been recorded or noted during the interviews.

- Headmaster's common lack of basic knowledge about GENIE's vision.

- Common failure to identify the difference between a GENIE Multimedia room and an ICT room.

- Occasional banning of non-ICT teachers from using the MMR because of the previous issue

- Constant concern of getting the hardware damaged or stolen

- Lack of initiative to repair disabled or damaged hardware by involving the association of students' parents or seeking partnerships

These remarks have been assented by teachers who added

- Complete lack of post-training follow-up by the administration (delegation/GENIE …)

- Non-ICT teachers deem the training ineffective as they are often denied access to the MMR

- ICT teachers oppose allowing other teachers into the ICT room because they had to sign an inventory list and are, thus, deemed responsible for any damage of equipment

- Those who have the privilege to access the MMR work with oversized groups where it is impossible to provide the appropriate care for each student

- Many MMRs are not connected to the internet and the school may not wish to be committed to any binding internet fees.

- The material, which was provided by GENIE before 10 years or more, is in decay shape and does not meet today's software and performance requirements.

- MMR apparatus in some schools is used for administrative purposes such as uploading/downloading results, making daily reports, enrolling students …

These concerns and hardships were discussed with Y.E, I.C and T.E, accredited GENIE coaches in ICT who were in charge of many training courses in the academies of Fez, Meknes, Marrakesh and Tadla Azilal. From their perspective, these undeniable issues severely constrain the attainment of an ideal training as it should be and have to be tackled by all the actors involved in the process locally and nationally. They also added that coaches endure difficulties as well while on mission that usually go overlooked.

- Some teachers were summoned by the ministry delegations to participate in a training without considering their interest in the process.

- Teachers' ICT prerequisites are not identical and lead to a disparity of the starting point, which disturbs the training pace

- Selection of candidates is not part of the process. For instance, training was provided to many teachers who would reach the retirement age within months.

- The hardware material is occasionally broken down or not sufficient

- Some demotivated teachers see no substitute to ink and paper activities for classroom activities

- Coaches were not involved in the authorship process of training components

- The training guidebook was not literally followed as it is full of hyperbolic instructions about "setting-the-scene" discussions. Sections have been skipped for fear of not completing the practical parts.

### 6.2.5.1. Change Management

Although the approach has been tackled from different aspects depending on the model's area of implementation as illustrated earlier in this study, the stages of Change Management could be summarised in 3 essential stages; pre, while and post change.

Stage 3: Maintaining change, promoting the new added value and encouraging feedback

Stage 1: diagnosis of problems, assessment of asset, setting a plan, clearing obstacles and motivating participants

Stage 2: assigning responsibilities and introducing new actions and checking the involvement
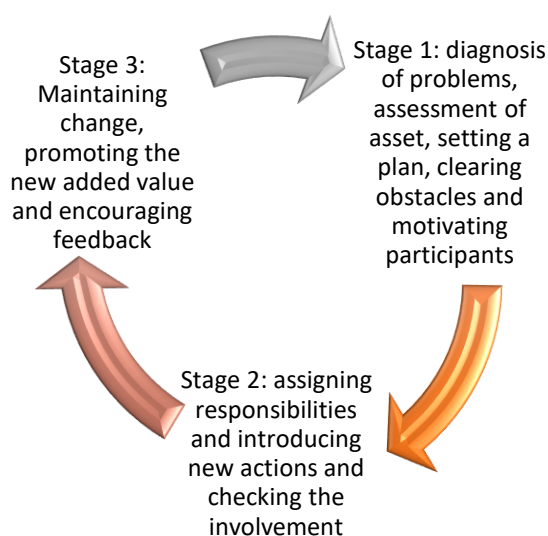
Figure 33: The three core stages of Change Management

While working on this study, and during the process of data collection and analysis, one may get the impression that the relationship between GENIE and CM approach is missing or, at least, loose and totally lacking clarity. Following are

synthesis remarks supported by face-to-face testimonies that reveal GENIE's asynchrony with CM approach, especially in the third stage[17].

The process of maintaining change and promoting new practices provides conclusive appraisal of the CM implementation in GENIE programme. From 2006 through late 2011, and after almost 6 years of its inauguration, GENIE was lacking a progress or any impact check mechanism that addresses the usage of technology placed at the disposal of teachers. In November 2011, and after 3 years of announcing the "adoption" of CM approach within the framework of GENIE's pedagogical contribution to the Urgency Plan, GENIE announced the commencement of the National Observatory of ICTE Uses (NOICTEU). It was meant to undertake the mission of closely monitoring and evaluating the uses of ICTs in education via use indicators. This observatory can support the integration process by publishing reports on studies to be conducted based on national indicators of ICT use in education (GENIE department, 2012). Although this tool is essential and produced two internal evaluations in 2012 and 2014, such announcement came a bit tardily and may not be of great help to reinforce early trainings that took place between 2006 and 2012. Even the two internal evaluations, often presented by the directorate in conferences as a fruit of the observatory contain lots of inaccuracies and violations of academic principles at the level of data collection and analysis.

According to GENIE accredited coaches that were interviewed by the author, on-site visits conducted by delegates of the NOICTEU were restricted to MMRs used primarily by ICT teachers. Language and MSP teachers were not concerned with these visits although they had participated in the same trainings. These visits took the

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[17] See the discussion chapter for more elaboration on issues with stage 1 as well

form of inspections rather than visits of accompaniment and guidance as the brochure explains.

The CM approach as a reinforcement instrument of newly acquired knowledge and behaviours has not been adopted as the literature instructs due to the missing vision, inappropriate academic background and lacking execution tools in this area of study. Otherwise, GENIE, in its endeavour to motivate talented and creative teachers, celebrates annually initiatives of ICT and Technology teachers interested in developing educational software through a national contest of the best educational apps. Though it may not seem enough, the initiative reinforces values of recognition and reward.

**6.2.6. Outcomes:**

**6.2.6.1.Teachers' Outcomes**

When the four-level impact evaluation was first introduced by Kirkpatrick, the Result was the fourth and ultimate level that produces a conclusive judgement about a programme. He, on the other hand, left the term open to different interpretations to fit in different contexts and meet the maximum of aspirations. The results, in this regard, could be financial profit, change of attitude, growth of production, etc. Guskey's interest in education, however, made him appropriate this level, which he calls Outcomes, and attribute it to the arena of education. This section will address the outcomes based on the testimonies of teachers, followed by the those provided by students.

Teachers were asked if they think technology helps their students achieve better outcomes including grades and behaviour. 88% of N=249 have no doubt that technology helps in this regard, while 12% think that the impact is either limited or

not existent all together. This level of accordance is the highest in our study and reveals the teachers' awareness of ICTE's quasi-miraculous impact on learners.

These results align with those provided by GENIE alumni whose vast majority 86% think that their students' achievements enhance thanks to ICTE. Interestingly and unlike the mass population, no one of GENIE alumni denies its usefulness.
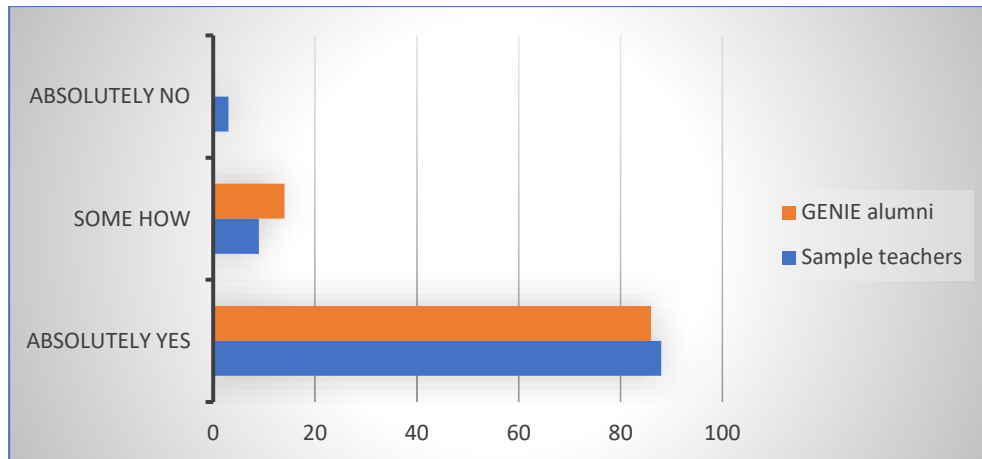


Figure 34. Q: Apart from raising their motivation, do you think technology helps students achieve better results at school?

The standard deviation analysis did not reveal any substantial difference as well between the two populations

**Standard Deviation**

|  | N(%) | Mean | Std. Deviation |
|---|---|---|---|
| Mass teachers | 100 | 1.8500 | .43519 |
| GENIE alumni | 100 | 1.8600 | .34874 |
| Valid N (listwise) | 100 |  |  |

Table 27. Q: Do you think technology helps students achieve better results at school?

Nonetheless, when GENIE participants were asked if they had empirically verified this speculation, most of them answered no or failed to tell how they verified it. Clear answers on how technology helps students seize better results were provided by ICT and technology teachers.

Table 27. Q: Did you verify this progress yourself?

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 71 | 84.1 | 84.1 | 84.1 |
|  | Yes | 12 | 15.9 | 15.9 | 100.0 |
|  | Total | 83 | 100.0 | 100.0 |  |

GENIE alumni who provided affirmative answers think that when technology places abundant classroom material, authentic learning tools (audio-visuals), interactional learning platforms (with other students), etc. at the disposal of students, their chances to get better results unquestionably improve. All participants, including GENIE alumni, mentioned motivation as an immediate short-term profit.

As GENIE alumni are supposed to acquire basic knowledge about ICT trainings, it is imperative to test their general culture relative to educational technology. Hence, GENIE alumni, including ICT teachers, have been asked 5 questions about their familiarity with ICTE terms that are frequent in today's trainings and workshops: MOOCs, E-learning, M-learning, LMS and Moodle. Familiarity with these umbrella terms indicates an embedded familiarity with subordinate topics, trends and issues that is essential to any academically established ICT expertise. The mini-quiz results may provide a rough yet invaluable assessment of GENIE training outcomes that must align with the strict minimum of global standards.

Table 29. Q: Are you familiar with MOOCs?[18]

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 60 | 71,4 | 71,4 | 71,4 |
|  | Yes | 23 | 28,6 | 28,6 | 100,0 |
|  | Total | 83 | 100,0 | 100,0 |  |

[18] MOOCs: Massive Open Online Courses provide open access training to unlimited number of interested individuals on the net.

Table 30. Q: Are you familiar with E-learning?[19]

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 16 | 19,0 | 19,0 | 19,0 |
| | Yes | 67 | 81,0 | 81,0 | 100,0 |
| | Total | 83 | 100,0 | 100,0 | |

Table 31. Q: Are you familiar with M-learning?[20]

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 68 | 81,0 | 81,0 | 81,0 |
| | Yes | 15 | 19,0 | 19,0 | 100,0 |
| | Total | 83 | 100,0 | 100,0 | |

Table 32. Q: Are you familiar with LMS?[21]

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 72 | 85,7 | 85,7 | 85,7 |
| | Yes | 11 | 14,3 | 14,3 | 100,0 |
| | Total | 83 | 100,0 | 100,0 | |

Table33. Q: Are you familiar with Moodle?[22]

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 72 | 85,7 | 85,7 | 85,7 |
| | Yes | 11 | 14,3 | 14,3 | 100,0 |
| | Total | 83 | 100,0 | 100,0 | |

19  E-learning: Electronic Learning

20 M-Learning: Mobile Learning

21 LMS: Learning Management System

22 Moodle: Moodle is a Learning Platform or course management system (CMS) a free Open Source software package designed to provide educators, administrators and learners with a personalised learning environment.

It is noted that except for e-learning, which 81% of N managed to recognise, most participants, including many ICT teachers, failed to identify the 4 other items. The average cumulative percent of Yes is 31,44%, while 68,66% goes to No
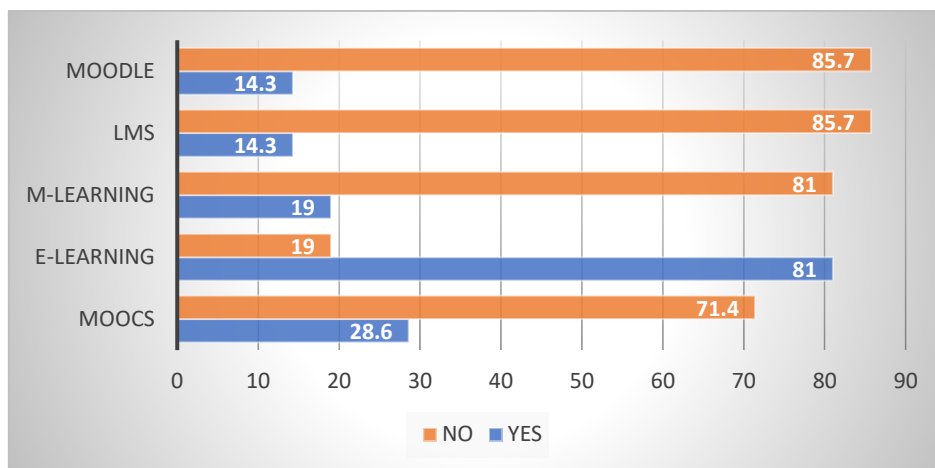


Figure 34: familiarity with key components of ICT trainings

On an index reference, teachers who have been assessed on the basis of their familiarity with frequent ICTE jargon scored as little as 1,57 out of 5.

### 6.2.6.2. Students' Outcomes

As these trainings should have left an impact on students, the student's questionnaire investigated their attitude and behaviour vis-à-vis technology at school and beyond. The first question inspects the relevance of ICT in the classroom from a student perspective. 88% of students think that ICT is indispensable to their learning, while only 12% think that the class can do without.



Figure 36. Q: Is ICT important in the classroom?
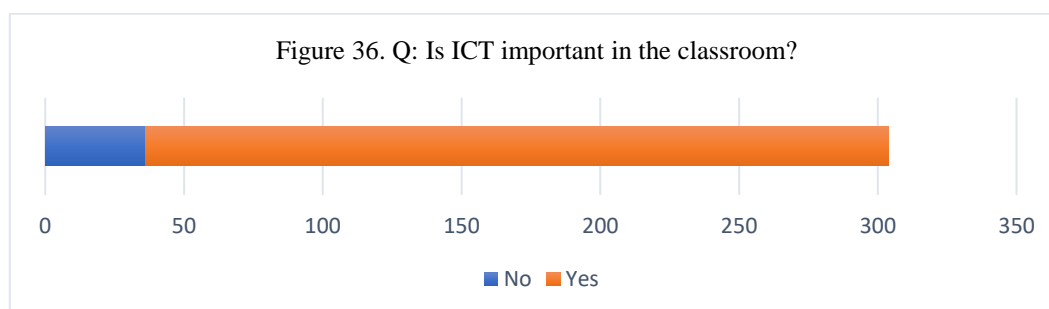
In order to unveil any changes of learning attitude and behaviour that may have taken place thanks to ICT, students were asked whether they believe they can conduct a school project without resorting to ICT.
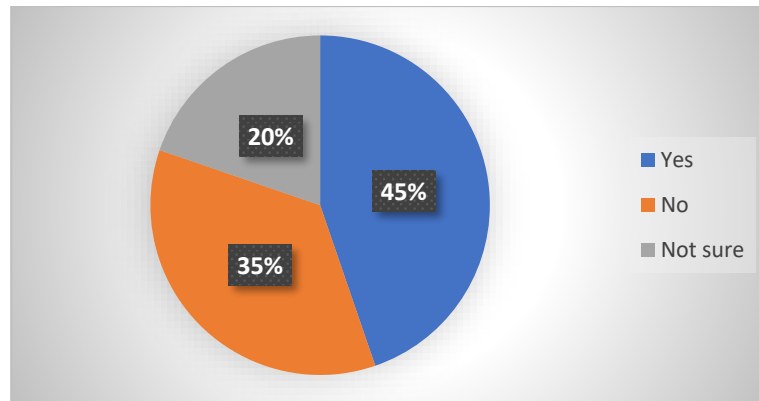


Figure 37 Q: Can you conduct a school project without ICT?

The results reflect a perceptible yet not entire dependency on technology. 55% of students are either not sure or cannot perform such a task without ICT. Youtube and Wikipedia came on the top of most popular reference websites.

Students were asked how often they use the MMR without counting ICT classes. The largest majority never visits the place although it is available in all of the sample institutes.

**Table 34. Q: How often is the MMR used by your MSP & Language teachers?**

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | never | 262 | 86.2 | 86.2 | 86.2 |
|  | rarely | 30 | 9.9 | 9.9 | 96.1 |
|  | sometimes | 8 | 2.6 | 2.6 | 98.7 |
|  | often | 4 | 1.3 | 1.3 | 100.0 |
|  | Total | 304 | 100.0 | 100.0 |  |
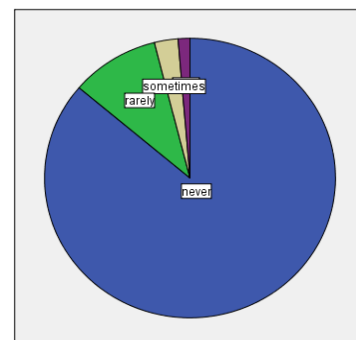
Students were asked if their MSP and Language teachers use their own technology in the classroom. Although the MMR is not frequently used, a good number of teachers tend to compensate using their personal material, according to their students' testimonies.

**Table 35. Q: Do MSP & L teachers use technology in their classrooms?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | never | 6 | 2.0 | 2.0 | 2.0 |
| | rarely | 72 | 23.7 | 23.7 | 25.7 |
| | sometimes | 170 | 55.9 | 55.9 | 81.6 |
| | often | 50 | 16.4 | 16.4 | 98.0 |
| | always | 6 | 2.0 | 2.0 | 100.0 |
| | Total | 304 | 100.0 | 100.0 | |
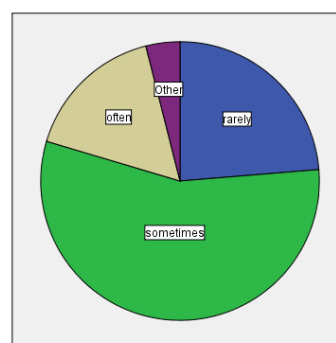


The survey also proved that when the teachers use technology in the classrooms, they have more tendency to adopt a blended model of m-learning and e-learning in their classrooms.

Table 36: Correlation of ICT use and m-learning

| | | Do MSP & L teachers use mobile gadgets in their classrooms? | Do MSP & L teachers use technology in their classrooms? |
|---|---|---|---|
| Do MSP & L teachers use mobile gadgets in their classrooms? | Pearson Correlation | 1 | .279** |
| | Sig. (2-tailed) | | .001 |
| | N | 304 | 304 |
| Do MSP & L teachers use technology in their classrooms? | Pearson Correlation | .279** | 1 |
| | Sig. (2-tailed) | .001 | |
| | N | 304 | 304 |

**. Correlation is significant at the 0.01 level (2-tailed).

We may conclude that there is a significant positive relationship between the use of ICTE and the tendency to use m-learning, *(r(302) = .27, p = .001)*

On the other hand, students assert that they are not always allowed to use their mobile gadgets for educational purposes at school.

|  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| no | 226 | 74.3 | 74.3 | 74.3 |
| yes | 12 | 3.9 | 3.9 | 78.3 |
| Valid sometimes | 66 | 21.7 | 21.7 | 100.0 |
| Total | 304 | 100.0 | 100.0 | |

Table 37. Q: Are the mobile gadgets allowed in the classroom for educational purposes?

While students may not use their mobile gadgets in the classroom, they still have a strong tendency to use them outside to watch educational videos, check dictionaries, check ministerial websites, exchange reports with classmates, etc.

|  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| never | 12 | 7,9 | 7,9 | 7,9 |
| rarely | 5 | 3,3 | 3,3 | 11,2 |
| sometimes | 39 | 25,7 | 25,7 | 36,8 |
| Valid often | 53 | 34,9 | 34,9 | 71,7 |
| always | 43 | 28,3 | 28,3 | 100,0 |
| Total | 152 | 100,0 | 100,0 | |

Table 38. Q: Do you use your mobile phone for educational purposes (at home)

Being a practitioner in the field, the author is aware that some teachers adopt the inverted classroom strategy with their students using a distant learning platform where they communicate, share and interact with their students. This practice is highly encouraged by GENIE coaches during the preliminary workshops. Students were asked if their teachers use such an approach.
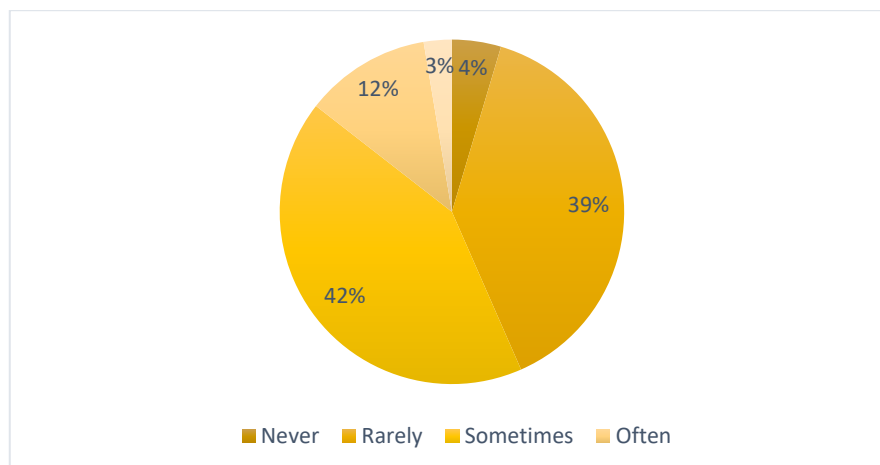


Figure 38. Q: Do you communicate with your teachers using a web interactive platform?

The results prove that this practice is not yet widely popular at least in the cases under study.

Students were asked whether they think ICT has any credit for enhancing their classroom productivity. Almost 85% of students think ICT improves their performance at school

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 14 | 4.6 | 4.6 | 4.6 |
| | Yes | 244 | 80.3 | 80.3 | 84.9 |
| | Not sure | 46 | 15.1 | 15.1 | 100.0 |
| | Total | 304 | 100.0 | 100.0 | |

Table 39. Q: Do you think ICT enhances your productivity at school?

In our pursuit to examine the actual impact of attending the MMR on the students' achievement, three variables have been correlated to examine whether they interrelate in any shape or form: MMR attendance, last year's grades, this year's grades (first term). Students who never had access to the MMR have also been involved in this procedure to verify whether this was disadvantageous to their performance or had no significant impact at all.

Table 40: Correlation of MMR frequency of use and grades

| | | How often do/did you attend the MMR? | What was your grade/mark last year? | What was your grade/mark last semester |
|---|---|---|---|---|
| How often do/did you attend the MMR? | Pearson Correlation | 1 | -.144 | .068 |
| | Sig. (2-tailed) | | .077 | .406 |
| | N | 304 | 304 | 304 |
| What was your average grade/mark last year? | Pearson Correlation | -.144 | 1 | .755** |
| | Sig. (2-tailed) | .077 | | .000 |
| | N | 304 | 304 | 304 |
| What was your average grade/mark last semester | Pearson Correlation | .068 | .755** | 1 |
| | Sig. (2-tailed) | .406 | .000 | |
| | N | 304 | 304 | 304 |

**. Correlation is significant at the 0.01 level (2-tailed).

The chart depicts no significant correlation whether positive or negative between the training provided in the MMR and the students' grades/marks over a year and half. Students who have been invited to the MMR by their language and MSP teachers did not show any significant supremacy over their peers who have never been to, at least in terms of grades. This might relate to the quality of available equipment, the nature of activities provided by teachers, or the lack of adequate resources to exploit the hardware.

Chapter VII

Discussion of Results and Recommendations

The process of programme evaluation is a healthy practice that seeks building a constructive assessment based on unbiased standards and criteria. GENIE, like any programme in other parts of the world, has successes to be celebrated and failures to be mended. In this chapter, the study findings will be given further explicit analysis to propose recommendations to stakeholders and interested bodies.

## 7.1. General Observations

Observations that have been generated prior to initiating this research lead to the hypothesis that the programme's merits are far from being analogical with the invested colossal budgets that have exceeded, so far, 3 billion Dirhams funded by the Moroccan government, international development agencies such as USAID, KOICA, local partners and NGOs. The programme's approach to digitizing the Moroccan school was not accompanied by a lateral pedagogical pursuance to maximise profit for the most important affected parties; the teacher and the student. GENIE directorate, under the stressful pressure to manage the budgets and intermingled missions of stakeholders, have set the equipment of schools as a priority and somehow disregard investing properly in qualifying the human factor that should undertake the mission of establishing change. The exploitation of apparatus was paid attention to in 2009 when a fourth axis of development of use was introduced. Consequently, and as the surveys report, the programme failed somehow to meet the aspirations of students and teachers, and ultimately it was hard to empirically assess the added value of GENIE on the Moroccan school in terms of academic achievement.

While working on data collection, we came across a number of documentation demerits that contributed to fossilising certain imperfections and to hindering the achievement of the desirable progress. Firstly, it is noted that there have been several academic publications by experts that addressed the programme's pitfalls, mainly the

scandalous low completion rates[23]. As the lacunae persisted for years, one may understandably argue that the studies have been belittled by the directorate which chose to remain in denial by not communicating the challenges. Suspicions of public money dissipation have gone even more prevalent, especially that the official bulletins that explain or justify the spectacular failures throughout the execution phases of the ministry's ambitious plan to digitalise the Moroccan school were scarce, if not non-existent at all. Secondly, the directorate has been involved in promoting unnecessary exaltation of GENIE, which resulted in maintaining the status-quo. The study did not come across any official statement where GENIE officials admit failure, which they object as a term, to deliver in any of the four axes of work. To make matters even worse, the reports issued by the directorate contain figures that contradict with those issued by the ministry of education. For instance, the MMR coverage according to recent statistics issued by the ministry is around 45% while according to GENIE (2016) is 60%. The programme, according to the directorate, managed also to provide training to 100% of the ministry staff, while according to the study sample, which involved teachers from the four corners of the country, less than 40% of teachers attended the course. Thirdly, the internal evaluations carried out by GENIE's sub-division NOICTEU (the National Observatory of ICTE Uses) took place 3 years past the adoption of CM approach; the execution and monitoring processes should have been executed consecutively to reinforce the monitoring mechanism. The so-called evaluations also comprised contradictions and inaccuracies that are hard to ignore such as neglecting the teachers' feedback, although they had taken part in the study. Fourthly, the level of transparency related to sensitive data like budget allocations was

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[23] See GENIE 1 in the literature review

higher in GENIE's early years. From GENIE 2 and on, it became hard to have access to such database for concealed motives.

## 7.2. Review of the Six-level Findings:

### 7.2.1. Context:

"*GENIE project was the dream of all workers in the field of education. We were ambitious first, but our joy was not complete*" (Bakouch, 2013, p. 1. Translation.). According to Bakouch, the programme was intended to establish a "fundamental shift" in providing digital resources to the ministry and the Moroccan school. Earlier to 2006, schools' shortage of ICT was alarming compared to other countries in the MENA region that left Morocco lagging behind. Morocco had to act promptly and initiated a surge of programmes like E-Morocco, MARWAN, EUMEDIS, Virtual Campus, Nafida, and GENIE, etc. taking advantage of aid provided by international cooperative agencies. GENIE, in this sense, was a concretisation process of the ministry's 1999 vision to install an information society. These facts are sufficient to justify the well-established relevance of such a programme to the country and the society as well.

The enormous budget allocated to GENIE according to experts, including Jerrad (2015) the head of the Department of Educational Technology in Rabat, was sufficient to ensure a strongly subsidised debut of the programme by means of three axes of operation: *infrastructure, training and digital resources*; nonetheless, these axes were not uniformly administered. The results of our evaluation suggest that the planning phase was much focused on the purchase of apparatus, specifically hardware equipment and software licenses. Much less reflection, however, was given to the mechanisms of hardware exploitation and the pedagogical investment. For instance, and as the Court of Audit report (2014) explains, it took over 2 years to get the

computers connected to the web, so given that the software resources were extremely scarce back in 2006, the equipment remained almost unprofitable for about 2 years. Eleven years after the birth of GENIE, 72% of our surveyed teachers confirm that internet is not available in their institutes. To aggravate the challenges, our interviewed coaches disclosed that they had to work with their self-improvised material for 4 years after GENIE was launched, until a standard training methodology was conceived in 2010 and made public some time later in the training manual for coaches[24].

The management of infrastructure projects was characterised by serious irregularities. Our study reveals that in 96% of institutes where surveyed teachers work, GENIE's Multimedia room is used as an ICT room. As a matter of course, only ICT teachers are allowed access to the MMR since that privilege is bound by an inventory statement signed by them, as GENIE coaches explain. Such bureaucracy that prevailed in GENIE's early years fossilised reluctance to use the MMR even when there is room for flexibility to generalise and avail the service. As a result, 87% of sample teachers expressed their inability or reluctance to use the MMR. The finding implies that GENIE failed to constitute a new culture of information society where technology is available to all teachers and all learners.

One advantage of the new M-learning model is alleviating the challenges e-learning model undergoes in the Moroccan context such as the availability, affordability and mobility. Out of 304 interviewed students in 4 public schools, approximately 79% possess a smartphone that can be used for different educational purposes. This proportion might be seen as an invaluable ICT cistern in other underprivileged countries. Unfortunately, the sample teachers seem reluctant to open

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[24] This issue was also mentioned in the Court of Audits report in 2014

on alternative ICT solutions like this one probably due to their lack of adequate training and updates on this method. Even the school regulations and official circulars do not allow such a practice probably for fear of gadget theft or classroom distraction (Regional Academy of Education. Sous Massa, 2018). As a result, a unique opportunity to substitute traditional ICT tools goes wasted.

At the level of digital resources, the acquisition process was monopolised by Microsoft which provides Operating Systems and word processing licenses to all workers in the ministry who possess a professional e-mail (taalim.ma). Between 2006 and 2008 only, the project consumed 43.7 MDH according to the Court of Audit (2014). When interviewed about his stand and why not other alternatives that fall within "Open Source" technologies, Jerrad approves that the budget could have been invested otherwise if the directorate had opted for "Open Source" applications used in France, Switzerland and Canada such as Libre Office, Linux, Google Docs, etc. Ironically, many interviewed teachers have no idea about the free Microsoft Office license placed at their disposal which costs roughly 1500 dh for public users.

These context issues, and particularly prioritising the assessment of assets and financial provisions necessary to ensure coverage with hardware technologies, have been raised on the same interview with Jerrad (2015). In his pursuit of the factors that promoted these disruptions, he explained that GENIE skipped the stage of assessing problems that had taken place before 2005 and those the NCERE underwent while running the program in 2005 due to the ministry's will to surmount "*the condition of stagnation the programme underwent over a year because of the incompatibility of views between the NCERE and other stakeholders*", explains Jerrad. He adds that GENIE entrusted its partners (Intel and Microsoft) during the planning phase with full blind autonomy to draft a standardised training material, and it gave up the project

conceived by the MCEIE and Moroccan experts (scholars and ICT engineers) who have a closer expertise in the field of instructional technology and education. As a result, the course material has been exclusively restricted to Microsoft Office software leaving no room for open source material.

Considering the enormity and multiplicity of imperfections that represent an infringement of the measures advocated by the Change Management approach at the level of diagnosis and preliminary assessments, it is all natural to end up with a stumbling start-up for GENIE. Although the context of execution is characterised by a persistent demand for an information society within the Moroccan school reiterated by the king and legislative texts such as the Moroccan charter of education, the project was launched in an environment full of obstructive factors; the least of which is haste and lack of academic foundation.

### 7.2.2. Reaction:

It is surprising, and a bit disappointing, that GENIE's official narrative on the number of training beneficiaries sharply contradicts with our research findings. According to GENIE directorate (2016), 100% of the ministry staff took advantage of training workshops sometime between 2006 and 2016; while according to our survey sample, whose vast majority of participants have an experience of over 10 years, only 33% of teachers did. This brings into question GENIE's criteria to count trainees, given that our survey was conducted between 2016 and 2017; ten years after the commencement of the programme. Some interviewees mentioned that giveaway CDs distributed in schools may have been counted as actual trainings; the allegation has not been confirmed by this study.

In order to measure their first impressions or reaction, as stated in Kirkpatrick's model, vis-à-vis the conditions through which the training took place,

the study sheds light on four major elements that are material, time, coach, and overall satisfaction. The analysis of the feedback shows, however, a sort of contradiction; the accumulative percentage of reactions related to material, time, and coach is not consistent with the population's overall assessment of the training conditions. The training material scored 53% of partial or full satisfaction; time scored 74% of partial or full satisfaction; interaction with the coach scored 63% of partial or full satisfaction. The gross satisfaction rate of the three variables is 63,33%. Conversely, only 50% expressed their partial or full satisfaction about the training conditions in general. The inconsistency of values and poor scoring of the general first impression might be explained by the teachers' predominant judgment of the whole experience where the assessment of outcomes overlaps with the assessment of procedures.

To conclude, the teachers' attitude towards GENIE's training conditions remains positive to a large extent. A large proportion of the study population (almost 70%) expressed their absolute readiness to take the training course again if allowed to, and they highly recommend the training to their fellow teachers (89%). Still, interviewee coaches recommend taking measures to ensure that the apparatus is operational and sufficient in quantity.

### 7.2.3. Learning:

Having concluded that the training environment is relatively favourable according to the study participants, despite the frequent issues related to maintenance of desktops, projectors and mobile briefcases as ICT teachers testified, it is no guarantee that the learning process was also effective. Learning, as stated earlier, takes places once theories, indoctrinations, stimulations and motivations translate into a tangible improvement of the customer's savoir and savoir-faire.

The content of the training modules listed in the results chapter reflects the directorate wish to systematise and standardise the process of training, yet it undergoes several anomalies we would like to highlight. To begin with, the official syllabi was conceived 5 years past the inauguration of the programme (Court of Audit, 2014), which marks a sign of arbitrariness before that point when coaches relied on mere headlines and their own creative talents. Moreover, the content of the training creates endless controversies among trainees who think that it is either drowned in theoretical, glittering yet ineffective big words, or presenting unsuitable material of already transcended word processing drills. It is also confusing that the manual does not bluntly designate Microsoft word and data processing workshops as the principal component of trainings. As a result, a small proportion, as little as 20%, feel that the training helped them sharpen their ICT skills. More than the double of that proportion (42%) are convinced that the trainings did not serve them by any means. The rest remained doubtful about the utility of the training.

These results are a natural repercussion of poor planning, lack of creativity and quasi-ignorance of real-life needs of teachers and students in the classroom. It is seriously alarming to witness that only 12% of participants find that their competencies have been positively impacted thanks to the programme. When the content of a training course provided by a lavishly funded programme like GENIE scores as little as 2,16/5 on an index reference scale, it is imperative to take prompt measures and reconsider the worthiness of the programme.

### 7.2.4. Behaviour

Jean Piaget once said, "*The goal of education is not to increase the amount of knowledge but to create the possibilities … to invent and discover, to create men and women who are capable of doing new things*" (Silberman, 1973, p. 102). Probably

Piaget in this famous quote refers to basic education for children and young people, but one may still argue that the saying bears borderless truth applicable to all types of learning regardless of the purpose or the target population. I strongly believe that the learning outcomes of GENIE training courses would become useless once they remain unproductive or void of utility and visible influence. GENIE is a massive investment that seeks making a change of learning/teaching behaviours.

The first question pertinent to behaviour was about the frequency of technology use in the teachers' habitual classrooms. All the 249 participant teachers, including those who did not participate in GENIE trainings, have been asked the question to draw a contrastive analysis of their tendencies and see if GENIE trainings had any impact on the alumni's attitudes. On both a proportional and standard deviation scales, the answers demonstrate that GENIE alumni have higher disposition to use technology relying on their own material. Although the answers provided by ICT and Technology teachers were disregarded for fear of tipping the balance, the result was not any different as ICTE can serve the teacher and the student as well regardless of the study field.

The next question of the teachers' attitude towards technology reveals that the teachers' positive stand is a pre-existing assumption more than it is a result of GENIE trainings, at least for almost 71% of participants. On the other hand, seeking alternative solutions by using mobile gadgets in the classroom does not seem like a reliable solution for many participants when they run short of hardware material. Around 40% of participants never or rarely use their mobile gadgets in the classroom, including GENIE alumni. The rejection rate is higher when it comes to allowing the students to use their mobile gadgets, which suggests that the programme does not target enhancing alternative IT solutions for fear of violating regulations in certain

academies that strictly forbid the use of smartphones in the classroom for both the teacher and the students. Sous- Massa academy, for instance, issued a circular note under the reference 01/2018 that urges the teachers and the students to refrain from using their smartphones inside the classroom in conformity with other ministerial circulars that, astonishingly, address the issue of violence at school not technology or mobile gadgets!

One more element that impacts the adoption of new work/learning behaviour is related to the axis of digital resources, which is not helping any better. While online resources provide an invaluable opportunity to establish a formal learning model that meets the conditions of conformity, reliability and credibility, lots of challenges are undermining the axis full potentials. The availability of resources is notably disproportionate in favour of scientific fields such as Physics, Chemistry, Science and Math. Applications of pertinence to languages and humanities are a bit ignored probably due to the profile of the committee members in charge of these resources, or probably because of their moderate experience in the field of education and teaching being IT engineers and technicians, as Jerrad explained.

The extremely poor material dedicated to languages and humanities, especially English, on the platform is also characterised by randomness and arbitrariness. It is very natural that teachers and students would resort to alternative websites that can provide better quality material. Almost 89% of students never visit websites sponsored or launched by the ministry. In an interview with a sample group of students, they justified their answers by the fact that they know nothing about Taalimtice.ma, and they prefer to look up elsewhere on "YouTube" and "Wikipedia". The ones who provided affirmative answers mentioned that they log in "Mouatamadris.men.gov.ma" solely to check the grades submitted by their teachers.

GENIE coaches mentioned that alumni often complain about the unavailability of a ministerial networking platform for teachers. The MKTC did not work on setting up a networking application capable of linking schools together wherein teachers and their students can collaborate and share their learning experiences with their peers in other parts of the country as it is the case with MARWAN in higher education. The existence of such a formally administered platform would be advantageous more than the conventional social media apps that may set them easy targets for hacking and privacy intrusion.

### 7.2.5. Organisational Support

Internalising newly acquired skills and knowledge requires a synergy of efforts and a synchronous action plan where every component serves as an essential cog, without which the whole process is doomed to failure. The results in relevance to the Organisation Support that have been reviewed in the previous chapter reveal probably the most serious sicknesses of GENIE. Following the execution of projects related to infrastructure, training and digital resources, being the initial axes of GENIE, alumni cannot help reflecting on questions like "Is my ICT practice sound and in accordance with the training I had received?" "What should I do when issues related to the environment jeopardise my efforts?" "Are my peers in other schools enduring the same challenges that I have?" "Is my effort paying off? how would I verify?", etc. The existence of a national, regional and local reference authority that clears logistic and administrative difficulties, provides guidance and collaborates efforts becomes primordial. Taking into account their mission statement, representatives of GENIE have, unfortunately, very limited margins of interference, which reiterates the call issued by the Court of Audit (2014) to reconsider the managerial as well as the leadership model adopted by the programme directorate.

The semi-structured interviews with headmasters, teachers and coaches revealed several anomalies that can be summarised in the following. Many headmasters have issues with the administrative management of hardware and the MMR, poor ICT qualification and strictly limited autonomy to resolve the MMR problems. Non-ICT teachers are constantly challenged by the denial of access to the MMR, the impossibility to network with their peers and the lack of follow-up accompaniment. ICT teachers, on the other hand, complain about the frequent apparatus failure and the exploitation of the MMR for administrative purposes. Last but not least, GENIE coaches endure hardship with the uneven ICT skills of trainees, lack of candidates targeting, apparatus failure and limited practicality of the training syllabus.

### 7.2.5.1. Change Management Strategy

When GENIE directorate adopted the five-measure project entitled "Integration of ICT and Innovation in Learning" as a contribution to the 2009 Urgency Plan, it was meant to improve the control mechanism of GENIE operations, trainings, ICT integration into the classroom, etc. Theoretically, had the approach been implemented properly, it would have served as a sound control mechanism that accompanies and guides practitioners throughout the different stages of the project. Realistically, when the NOICTEU confined itself in the role of assessment, it failed to fulfil stage 3 of the CM approach. The board's heavy focus on conducting two successive internal evaluations in 2012/2013 and 2014/2015 negatively influenced the mission of maintaining change, celebrating the teachers' ICT use in the classroom, highlighting the ICTE new added value for apprentices and encouraging feedback.

### 7.2.5.1.1. Critical Remarks about 2012/2013 Report

The report places its credit at stake due to the deployed methodology, if there is any, and the contradicting findings. First, the evaluation of the programme was undertaken by the directorate's subdivision called the National Observatory of ICTE Uses (NOICTEU) which may result in an infringement of impartiality. Although the directorate may be well-informed about GENIE's strengths and failures, conducting the evaluation by an "insider" evaluator may lead to bias and subjective tendency to favour the programme over other alternatives (Smith et al., 1997 as cited in Hurley et al., 2002). An insider's evaluation may also endure difficulties promoting trust and assuring confidentiality of input. The ministry of education would have averted this apprehension by assigning the mission to alternative agencies such as specialised study firms, the NCERE or even the National Centre for Evaluation and Examinations. These departments have a good idea what GEN IE is about[25] and are reference marks in the process of evaluation. They constitute a good solution for the "insider" versus "outsider" opposing paradigm given that they are neither too much close to compromise objectivity, nor too distant to diminish insight and understanding. (Patton,2008 as cited in Rossingh and Yunupingu, 2016)

The report might also be criticised for drowning the reader in numbers and ill-organised statistics on the very first page with no preliminary introduction of the study, why it was conducted, within what theoretical framework, or what even GENIE is about. The data collection process does not involve any face-to-face interviews with first hand practitioners whose statements would give more sense to the study.

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[25] Prior to the establishment of GENIE directorate, the National Centre for Educational Renewal and Experimentation was in charge of launching the program in 2006 and setting up a road map for staff trainings

Moreover, the population of the questionnaire was restricted to teachers of scientific subjects in high and middle schools including MSP, in addition to primary school teachers and inspectors. Languages again were not involved in the study despite the frequent calls issued by his majesty king of Morocco and the Urgency Plan of 2009/2012 to alleviate the deteriorating condition of language teaching/acquisition in Morocco. Although the sweeping majority of interviewees are teachers, the released evaluation bulletin comprised only inspectors and headmasters' findings and ignored those submitted by teachers with no explanation. Even the teachers' self-assessments of their own strengths and weaknesses in relevance to ICT were submitted by inspectors on their behalf as seen in the example bellow.

1) المحور التقني التنظيمي :
▪ أكد المفتشون المستجوبون أن:
• (82,8%) من الأساتذة لا يجدون صعوبة تذكر في تشغيل العدة الديداكتيكية و(77,7%) لا يلاقون صعوبة في توظيفها؛
• (50,1 %) من الأساتذة يجدون صعوبة في صيانة العدة؛

Translation:
    Technical-organisational axis:
    Surveyed **inspectors** affirm that:
- 82.8% of **teacher** find no significant difficulty to run the didactic hardware, 77.7% have no problems employing it.
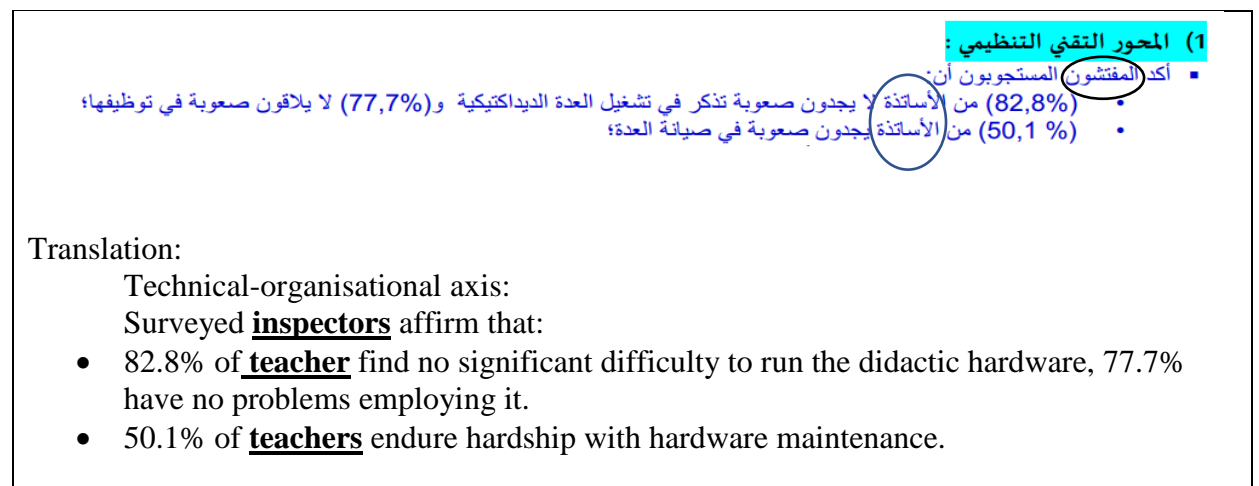- 50.1% of **teachers** endure hardship with hardware maintenance.

Figure 39: Excerpt from GENIE 2012 report (GENIE 2013)

It is also noted that, for some reason, the remarks and recommendations section enclosed in the inspectors' questionnaires was not present in the version handed out to headmasters and teachers who are, actually, in charge of the immediate implementation process. This implies that the top-down strategy is still prevailing even in the evaluation process. Finally, the reviews of costumers, who are students in this case, were completely ignored.

At the level of generated data, it is noted that the study is unbalanced in favour of the inspectors' sample. The study lists 20 proportional figures and 3 recommendations based on the inspectors' feedback, in addition to 1 conclusion and 4 recommendations based on the headmasters' and none from the teachers. The positive feedback of inspectors was deemed sufficient to make conclusions about the relevance of GENIE. The vast majority of surveyed inspectors harbour a high opinion of the teachers' management of ICT in terms of utility, appropriateness and added value in the classroom. This finding contradicts with the concluding speculation that there are remarkable contrasts between teachers in terms of knowledge and skills in relevance to ICT that require an urgent intervention to mend this gap. As for the headmasters, the evaluation jumps to the recommendation section that there is an eminent need for training on hardware use, management of multimedia room and involvement in strategic plans.

### 7.2.5.1.2. Critical Remarks about 2014 Report

The report comes only a year after releasing the first evaluation in 2013, which is not sufficient to detect tremendous alterations especially that it uses the same methodology under the same objectives. It was conducted again by GENIE's NOICTEU and was victim of the same pitfalls spotted in the 2012/2013 version; for instance, observations and recommendations submitted by teachers are not incorporated in the released version of the evaluation. Only those submitted by students, headmasters and inspectors were made public. It is also noted that the figures are notably inconsistent with those released in 2013 as seen below. Certain values increased while others decreased with no elaboration on how or why the disparities have taken place.
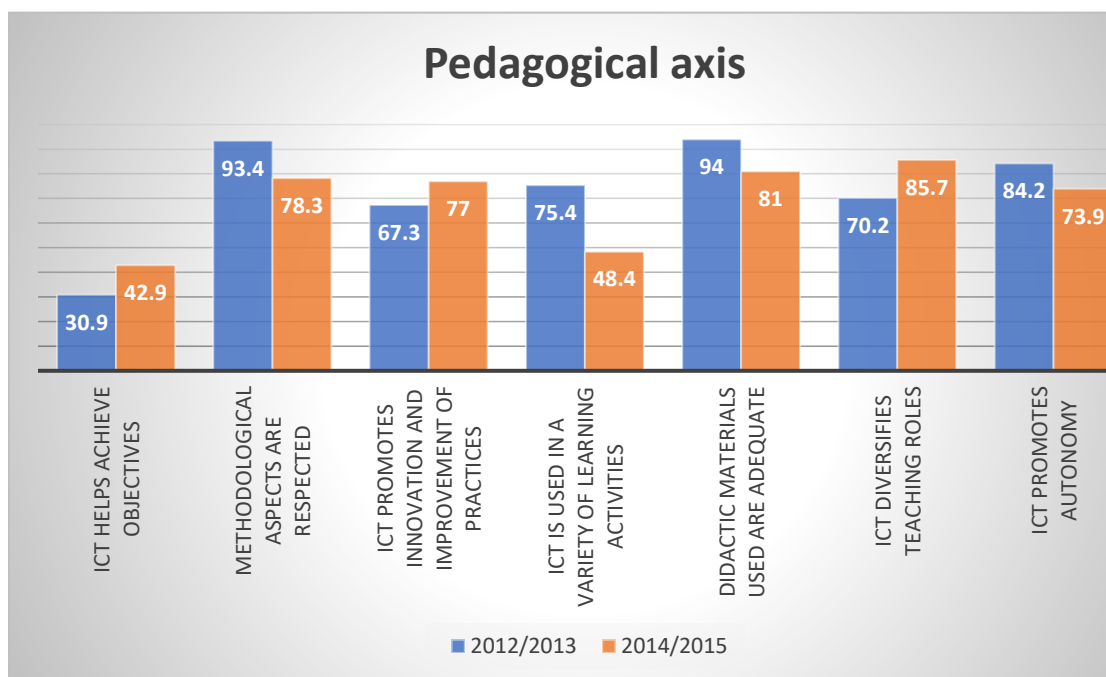
Figure 40: Sample of the inspectors' feedback on the implementation of ICT in the classroom.

The figure above shows clearly that results of the assessment are inexplicably inconsistent and have no pattern whether progressive or regressive. The ratio of disparity of variables in the sample shown above (progressions and regressions) ranges between 10,3% and 27%, which is salient and hard to explain how it took place within just one year; thus, it may not serve as a solid background for a constructive recommendation. This may explain why no comparative analysis of results was made by the commission that should, otherwise, be compelled to justify the regressions and random differences.

To conclude, the adoption of the CM approach, which has been reiterated in GENIE's training manual provided to teachers and coaches, must naturally lead to convenient plans, actions and procedures. When the accredited coaches Y.E, I.C and T.E were asked about the CM approach, they humbly expressed their total ignorance about its intricacies since "*theories do not fall within the scope of their routine practices and interests*". The attitude might seem to be plausible given that they were

not instructed on the approach's expected reactions and effects, techniques to be deployed or steps of realisation. Achieving positive results that align with the approach's rational requires an active involvement of all stakeholders, especially teachers and inspectors, in the process by providing them with all the necessary information about the target competencies to be achieved by the end of the training. Articulating operational CM guidelines for teachers and the control commissions mandated by the NOICTEU would make the approach more perceptible, meaningful and effective.

### 7.2.6. Outcomes:

This level of impact evaluation is probably the most salient of the six; it is the visible tip of the iceberg that stands on the other 5 levels. The most obstructive challenge we came across while working on outcomes is the unavailability of comparative sample results that belong to 12 or 13 years ago (before the commencement of GENIE) in order to identify any paradigm shifts that may have taken place thanks to GENIE. We, thus, had to rely on the expertise of veteran teachers who worked pre and post the ICT inclusion. Following, comes a discussion of result indicators pertinent to teachers followed by another one related to students.

### 7.2.6.1. Teachers' Outcomes

Both groups of teachers who received a training under GENIE programme and those who did not, highly agree that ICT helps their students achieve better outcomes including grades and behaviour. Comparing the answers of the two parties, by means of proportions and standard deviation, leads to the conclusion that GENIE has limited or no credit at all to the elevated teachers' awareness of ICTE relevance in the information age classroom. It is more likely an innate conviction the teachers have

developed throughout their in-service trainings and professional experience. Nevertheless, when the teachers were asked if they had empirically tested and compared the efficacy of ICTE themselves with their students, the vast majority's answers were negative leading us to assume that their conviction is rather a hypothetical supposition. The finding does not, by any means, deny the positive impact of ICT on learners' achievement at school, but it highlights the fact that, apart from raising the students' motivation, the benefits of ICTE are barely verified by practitioners.

Due to lots of ethical and procedural constraints, it was impossible to test or measure the teachers' mastery of ICTE material upon the end of GENIE's training. To compensate for this shortcoming, the author decided to measure the familiarity of study participants with 5 umbrella terms that are recurrent and widely popular in ICT trainings (MOOCs, E-learning, M-learning, LMS and Moodle). Positive or negative results might be interpreted as a strong or weak acquaintance with satellite areas of study related to ICTE.  It was expected that apart from ICT teachers, GENIE alumni would be able to identify at least 3 out of 5 key terms, which is very satisfactory though from my perspective. The result concluded that except for e-learning, the 4 other terms are largely ignored by our participants. It is also noted that the minority of participants who provided positive answers consists mostly of ICT teachers.

The finding implies that the training outcomes are poor in terms of standards, as interviewees mentioned in the learning section of evaluation. When compared to international ICT trainings, the rewards of word and data processing workshops (Microsoft Word/ Excel) are mediocre and not consistent with invested provisions, which urges the need to bring about a discussion on the relevance of these trainings and their alignment with international standards.

### 7.2.6.2. Students' Outcomes:

The students' outcome section, which is relatively more significant than the previous one, investigates the indicators of establishing an ICT empowered school at the information age and verifies their alignment with the ministry's vision in this regard. Although it is an established piece of information that not all of the students enjoy access to the MMR at school, the 304 sample participants from 10 classes belonging to 4 public schools have attended classes of some GENIE alumni teachers. The results whether positive or negative are not the direct aftereffect of GENIE programme; we only tried to study the school ICT environment and examine the abundance of factors that favour and encourage directly or indirectly the use of ICT for educational purposes, which is the role of GENIE programme.

The first question reveals a widespread innate awareness of the ICT relevance at school, and a readiness to be involved in ICT-based projects. The answers suggest that there is no affective filter towards technology that might, eventually, cause the process to slow down or even stall. As self-efficacy is amongst the most important assets GENIE capitalises on, 45% of students have confirmed their complete dependency on ICT to perform school projects. The number, which came lower than expected, fortunately, might be interpreted by the students' willpower not to abandon traditional learning methods and core skills that view technology as an instrument not an end itself. As Wikipedia and Youtube are on the top of the list of frequently consulted platforms, one may conclude that social media platforms such as Facebook, Twitter, LinkedIn are not yet widely exploited for educational purposes in Morocco.

Although the MMR is available in the four sample institutes, the sweeping majority of students testified that they never use it. In a direct interview with a group of participants, they were asked why they have never been welcomed to the MMR by

MSP or language teachers, but again they did not seem to have a clear explanation. On the other hand, over 70% of students confirmed their teachers' frequent usage of technology in their regular classrooms, particularly their own laptops and projectors. This might be justified by the teachers' readiness to incorporate ICT in their syllabi which is often challenged by a shortage of hardware at school.

The study, based on the students' feedback, confirms the existence of a significant positive correlation between the tendency to use of conventional technology and m-learning strategies in the classroom. It is concluded that the more teachers develop a tendency to use technology in their classrooms, the more they become open to using alternative learning models such as m-learning. The process, however, might be subject to vulnerability because the students are not encouraged by their teachers to use their mobile phones, despite their abundance in all the classrooms surveyed[26]. Professional and jurisdictional liability, in this regard, is still a barrier that inhibit the teachers from exploiting this potential as explained earlier. Students, however, affirmed their use of mobile devices outside school for educational purposes and interaction with their peers but not with their teachers. Training on the use of educational interactive apps is still missing in all the ministry teacher training programmes especially GENIE.

The improvement of productivity and performance at school is a major impact indicator that solicits the relevance of ICTE, thus, we asked students whether they think technology helps them achieve better results and higher marks. 85% of students bear a positive attitude towards the impact of technology on their performance at school, yet in the absence of a recorded history of the students' outcomes pre and post ICT integration we had to take refuge to the statistical analysis of students'

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[26] Almost 79% of students possess a smartphone

performance represented by grades (being an empirically measurable variable) versus the frequency of MMR use. The comparative statistical analysis of the two variables concludes that there is no significant correlation between the frequency of MMR access and achievement; consequently, it would be safe to presume that the MMR and ICT use in general may not contribute to enhancing performance (grades in our study), but it might contribute to enhancing the learning environment, teaching model and students' attitude. They may still affect other variables that are not under the scope of this study, which calls for further research in the future.

## 7.3. Recommendations:

Given that GENIE directorate announced in 2016 the continuation of the programme until 2030, this impact evaluation may not be considered as a conclusive summative one. Teachers and students' testimonies, being the start-up material for this study, helped in drafting recommendations that can contribute to the enhancement and supplementation of the four axes of the programme to become more effective and more responsive to their longings. Thanks to the correctional recommendations provided to similar ICTE programmes in Canada like SchoolNet, First Nations SchoolNet and Computers for Schools[27], these programmes are still thriving as model ones that closely abide by principles of good governance and ongoing assessment. Below, comes a list of recommendations that shed light on the most critical weaknesses that should be obviated once adequate measures are undertaken. The recommendations are listed in five sections that deal with governance and strategic planning, training, hardware equipment, digital resources and development of use respectively.

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[27] See chapter IV

**7.3.1. Governance and Strategic Planning:**

- The multiplicity of stakeholders (GENIE, MKTC, NOICTEU, NLDR, NRTA, NCERE, Intel, Microsoft …) may provide a richness of expertise for the programme as stated by Boudrar (2018), the regional coordinator of GENIE programme in Fez-Meknes Academy, but certainly makes the leadership model less effective (Court of Audit, 2014). The process of designating responsibilities, trainings and digital resources, for instance, may endure tardiness, conflict of ideas, conflict of interests and jeopardy of the accountability principle as Jerrad (2015), the head of the DET, approved. The condition of standstill GENIE went through in 2006 is but an example of repercussions that are likely to happen in the future when ideas contradict. Subdividing GENIE into different satellite programmes or different fully autonomous departments the mission statements of which are separate and more precise may help locate areas of vulnerability when failures take place. The experience of subdividing SchoolNet programme in Canada into peripheral programmes such as Computers for Schools, LibraryNet, First Nations SchoolNet, and Canada's Digital Collections gave a strong boost to the process of ICT promotion in Canadian schools and helped to locate anomalies with the LibraryNet programme, without having to distort the image of the umbrella programme. It was not about terminating the very successful SchoolNet but reinforcing the means of governance that will amplify and sustain the success achieved.

- As shown in the results chapter, there is no crystal-clear evidence that GENIE directorate abides by the standards of Change Management strategy, frequently cited in official documents, especially those relevant to phase 1 of CM approach (planning and assessment of assets) and phase 3 (maintaining change). The directorate is, thus, invited to take measures that favour the adoption and internalisation of new ICT

enriched practices at school and beyond. The establishment of the NOICTEU is an important step in the right direction, but the mechanisms by which it operates demand a prompt paradigm shift at the level of mission statement and staff qualification.

- As the internal evaluations are less effective when conducted by an insider body, which is a GENIE subdivision in our case, the conclusions would inevitably violate many evaluation principles, especially non-partisanship[28]. Because the commissions that conducted the 2012/2013 and 2014/2015 evaluations consisted of pedagogical inspectors, who may not have any prior experience in programme evaluation and auditing, the results incorporated superficial, contradictory and inaccurate data that are hard to invest. Based on the literature that tackles this point, we strongly believe that mandating outsider evaluation agencies such as IT Consulting, which conducted the 2008 moratorium, can give more validity, reliability, credibility and trustworthiness to the final product even if it includes unexpected disconcerting findings. As a reaction to this remark, GENIE coordinator in Fez-Meknes academy (Boudrar, 2018) thinks that undertaking the mission by GENIE stuff would not make the results any different; the claim is not supported by concrete evidence.

- The prolongation of a programme that was supposed to last for a three-year term is a derogation that must have been incited by a tangible success of the programme. Unfortunately, it was not the case as GENIE 1 barely managed to realise less than 25% of its objectives (Messoudi, 2013). Today, the department is promoting the 2015/2030 GENIE vision which might be seen as an unconditional proxy by the ministry where targets, commitments and responsibilities are blurry or even missing. The Court of Audit (2014) made an inference on the need to adopt a more binding

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[28] See outcome-based evaluation section

model of governance away from the existing "limited visibility", "limited planification" and "fragile synchrony" that characterised the execution of several projects. Maintaining the pace of 3 years maximum for each term with definite objectives followed by an outsider evaluation may save the programme lots of failures that may occur over 15 successive years. Sadika Gaougaou (2018), the regional ICTE councillor in Fez-Meknes academy and the provincial representative of GENIE, endorses the long-term prolongation. According to her, 15 years is the age of a student who completes middle school and joins high school, and one may not judge the effectiveness of GENIE till after it has taken enough time of operation. The rational of the idea seems peculiar and unusual, especially when compared to concurrent programmes listed in the literature review. She also added that periodical programmes are on their way out, but nothing happened 3 years past the announcement of the vision.

- GENIE directorate could have saved colossal budgets by substituting paid partnerships with Microsoft and Intel for not-for-gain partners, service providers, experts and donors like ComputerAid and Global SchoolNet. "*From February 2000, close **to 450 Namibian** schools received free hardware, free training on the OpenLab and Edubuntu operating systems and subsidised Internet connectivity, as part of the plan to empower youth through Internet access*" (Revolvy, 2018, web). Such organisations would help to cover under-privileged and remote areas that endure acute fragility in Morocco.

- The prolongation or suspension of the programme must always be institutionally regimented. The approval to give a term renewal for the programme must be supported by clear ROI reports that favour the decision. Deciding otherwise must also, by the same token, be supported by strong evidence of the programme's

mediocracy or failure. The frequent halts that took place under the mandate of the two former ministers of education, namely Mohammed Al Wafa and Rachid Belmokhtar, caused the programme a condition of laxity and irregularity of pace after its resumption. The decisions contributed to tarnishing the programme's reputation and stirred more speculations of public money dissipation, especially after demeaning declarations by Mohammed Al Wafa without presenting any official bills.

- The adoption of a strategy that exults over trivial achievements, magnifies numbers and defends failures can by no means be constructive. The 2016 conference paper, being the latest progress sheet we could reach by GENIE, contains data that is far from being accurate and may contribute to promoting the aforementioned speculations.

### 7.3.2. Training:

- GENIE's heavy focus on the technicalities enshrined in the axis of equipment marginalised the pedagogical aspect of the programme to a large extent. Openness on training centres (for trainee teachers, inspectors and administrators) and urging them to incorporate pedagogical material by GENIE within their training programmes would make the process systematic and more conducive. The MKTC often takes the initiative of sending invitations for weekly trainings to educators nationwide, but this is inefficient and financially exhausting since participants must commute every week to Rabat on their expense. H.A, an English inspector, finds it absurd to organise a training on cutting-edge technology without coming up with efficient ICT solutions. The weekly commute to Rabat could be avoided by simply organising regular web conferences or workshops via D-learning platforms in collaboration with local delegations.

- Given that GENIE professional trainings on ICTE for teachers are not promotional for Microsoft products, the syllabus is not supposed to be restricted to word and data processing software. The weakness of GENIE alumni at the level of familiarity with current ICT trends and available material like interactive whiteboards is alarming and demands an immediate reflection to upgrade the training standards to synchronise with the international ones. Gaougaou (2018) stated that GENIE is open to all types of training including those that incorporate Open Source apps, yet she did acknowledge that the directorate and affiliated branches do not accredit any training that is not homologated and certified by GENIE directorate.

- Favouring the workplan and training syllabi presented by Intel, represents an underestimation of national competencies (Jerrad, 2015). Conceiving a training programme by the ministry experts would always provide a simple answer to complex challenges related to culture and pedagogical needs away from false fascinations triggered by representatives of technology companies.

- Interviews with superintendents, teachers, coaches and students incite the need to integrate major revisions into the training guidelines in terms of rights and responsibilities, MMR access, software maintenance, prioritisation of beneficiaries, …

- Teachers and headmasters need to be motivated and sensitised as to how technology can reshape their static routines at schools. Trembling their intrinsic and extrinsic motivations would encourage more practitioners to take part in free MOOC courses offered by distinguished institutes worldwide and by GENIE. ComPracTice, the e-learning platform launched by GENIE in 2015, is a good example of programmes that require prompt attention as it barely managed to provide 4 MOOCs over 4 years.

### 7.3.3. Hardware Equipment.

- Thanks to GENIE, the equipment of Moroccan public schools has been partially accomplished at a steady pace, initially with desktops, video projectors and, later, with the Multimedia briefcases. However, teachers and students complain about the frequent failures and insufficiency of apparatus. Given that GENIE promotes the use of ICT and not specifically computers, investing in alternative budget solutions such as tablets would make more sense than repairing decaying Pentium desktops that have survived over a decade. Explicitly, the purchase of Mcafee antivirus licence for a computer, for instance, costs GENIE 50% the price of a decent budget tablet that operates under Android OS. Boudrar (2018) replies that maintenance of damaged material at this point is still the optimal efficient solution financially.

- In accordance with current pedagogical trends such as extended competencies, competency-based approach, standards-based approach…, access to MMRs should be guaranteed to all teachers regardless of their speciality discipline. The exclusive use of the MMR by ICT teachers results in a poor yield of GENIE investments.

- When ICT teachers are charged with maintenance of material, they are immediately and tacitly held accountable for the hardware damages that may accidently occur in the MMR, resulting in an infringement of their professional duties. Regular maintenance and check-ups by an IT subcontractor should maximise the profit hours of high school students back to 3 hours as planned instead of barely 19 minutes today (Court of Audit, 2014).

- Closed MMRs that represented over 25% in 2014 (probably more today) and the use of GENIE material for administrative purposes represents an evident waste of state resources, which requires the mobilisation of regional and provincial monitoring

committees. Such revelation is likely to trouble non-profit collaborators and donors who might get discouraged to cooperate in the future.

### 7.3.4. Digital Resources

- Weak or entire lack of internet networking, even in urban milieus, presents a restraining inhibitor of any ICT empowered learning scenario. In the information era, schools need to team up, collaborate and exchange with the outer world and peer institutes. The Court of Audit (2014) also makes clearly stated reference to communication "anarchy" caused by the unavailability of a unifying networking platform for schools and central services. Taking into account the risks of privacy and confidentiality that always rise while using conventional social media platforms, the study recommends establishing a filtered hub for peer and group exchange between all involved parties, especially students and their teachers.

- GENIE has made a massive bid to purchase operating systems, word and data processing programmes, filtering and protection licences that represent 90% of acquired programmes, yet they cannot be customised or enhanced to meet the particular needs of Moroccan teachers and students (Court of Audit, 2014). Alternatively, Open Source material whose source code is available provide free of charge, customisable and accessible substitute that has been disregarded over a decade. When the budget allocations went scarce or at least decreased post the announcement of the Urgency Plan failure, GENIE started to promote open source freeware apps such as Scratch. Although the initiative is a step in the right direction according to interviewed experts, the NLDR launched by GENIE is invited to localise these apps and many more to meet the specificities of the Moroccan school. Open Source material has been adopted by many educational institutes in France, Switzerland, Canada … and they celebrate the successful experience.

- Variety and diversity of available apps in the NLDR platform[29] is extremely poor. Boudrar (2018) acknowledges favouring apps with scientific content because the Moroccan students have more lacunae in these disciplines particularly. This claim is challenged by the fact that the students also endure acute weaknesses in foreign languages, yet the platform does not help greatly in this regard. The platform needs an update of available material that restores equity between all school subjects, especially languages and humanities. The platform may also need sponsored publicity campaigns via social media, for instance, in order to increase the number of the logins. No one of the 304 sample students in 10 classes belonging to 4 public schools mentioned taalimtice as a frequently visited platform.

### 7.3.5. Development of Use

- The ICT practice in Moroccan schools, or at least in the 4 sample institutes, relies heavily on the routine old-fashioned use of laptops, data/video projectors and audio players. The interactive board, for instance, available in 3 of these schools is rarely used for different reasons. GENIE needs to promote new learning scenarios wherein available smartphones, tablets or PCs are alternatively exploited to help learners remain connected to the world of knowledge anywhere anytime. Promoting alternative models that fall within the rubric of M-learning and D-learning models may liberate the learning process from formality when it is counterproductive. By the same token, the ministry through its regional academies is invited to make the convenient regulatory provisions that allow the use of mobile gadgets for educational purposes at schools.

- Inspection committees assigned to "inspect" trainings and MMRs are to be directed to undertake alternative missions of follow-up and companionship for all

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[29]  www.taalimtice.ma

GENIE alumni in all disciplines. Altering the logic of inspection by rather helping alumni to implement newly acquired learnings and skills in their real work environments will certainly give reassuring organisational support to adopt new teaching practices.

- GENIE does not support Assistive Technology which targets students with physical or mental disabilities. The NLDR's web platform does not contain any apps that help students with visual or auditory impairments in their daily struggles at school. A training on Open Source assistive technology apps, that have grown in number recently, would also give a more humanistic character to the way GENIE approaches this category of students.

- As sharing resources and experiences is a strong pillar of ICTE, it is important to take advantage of scholars who may be willing to share their academic views in this regard. Mandating the NOICTEU to publish short academic e-journal, for instance, about ICTE practices in Morocco would give the programme a much-needed academic prestige. CITI at Al Akhawyn University and many labs in Moroccan universities have accumulated a decent expertise in this academic endeavour; hence, collaboration with them is potentially going to be fruitful for all parties.

**7.4. Limitations and Recommendations for Future Research:**

- Post the 2008 moratorium, which unveiled disappointing progress rates about the programme, access to sensitive data that contain breakdowns or budgets has become aggravating. This however is by no means binding or constraining to this study that is intended to be pedagogical on the first place.

- Research within the field of ICT implies a constant race against the clock. Certain chapters and sections required frequent revisions and updates due to the ever-flowing novelties.

- The audit reports issued by the Court of Audit that bear harsh criticism and even accusing statements provoked stiffness for some GENIE officials. During the interviews, some of them objected the idea of audio recording the interview.

- Some interviewees in charge of some divisions at the directorate requested plainly that the study should celebrate and promote the achievements of the programme. They on the other hand objected using the term failures which they prefer to call challenges.

- The paramount challenge for the study was the lack of reference landmarks related to the students' grades pre and post the integration of technology at school that can be used to draw a comparative analysis. Future studies may trace archive records of generations that have been introduced to the MMRs for the first time between 2006 up to 2008.

- Future researches may tighten the scope of study to focus on a single GENIE workshop and accompany a limited number of candidates pre and post the training. The outcomes may, still, not provide a comprehensive evaluation of GENIE in its totality and may face some rigidity by those in charge.

# Conclusion

Throughout this impact evaluation of GENIE programme and its relevance to the Moroccan educational system, we have been keen to address the positive as well as negative aspects of the programme. By comparing the ICT hardware assets of Moroccan schools back in 2005 with those of 2018, one would find no reason to doubt the paradigm shift that has taken place thanks to GENIE. These successes that have been frequently celebrated by the ministry of education and GENIE directorate were recompensed in 2017 with Hamad bin Issa Al Khalifa award for the use of ICTE. However, a bottom-up analysis approach of ICT practices at schools that involve first-line stakeholders, namely the teachers and students, reveals numerous anomalies that should, eventually, lead to failures. These anomalies have been drawn attention to by academics, officials at the ministry, journalists, the Court of Audit and interested bodies. By the end of this dissertation, the Court of Audit (2018) issued a new report bearing heavy charges of massive budget dissipation to the Urgency Plan and affiliated programmes, including GENIE[30]. As the nature of our research falls within a purely academic framework, it tends to examine the practices with relevance to ICT placed at the disposal of teachers and students by GENIE. Additionally, the study places special focus on the impact of GENIE training courses on the teachers' ICT-assisted performance at school.

**Q: Does the programme meet the strategic trends of the country relevant to Information and Communication Technology?**

The study concluded that the programme acquires its relevance from the fact that it meets the strategic trends as well as needs of the country relevant to ICT. The

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[30] See https://ledesk.ma/enclair/education-jettou-detaille-lechec-cuisant-du-plan-durgence/
See http://www.menara.ma/fr/actualit%C3%A9s/economie/2018/12/13/2466416-plan-durgence-2009-2012-un-%C3%A9chec-retentissant.html

concept of GENIE, regardless of its operational lacunas or triumphs, goes in accordance with the E-Maroc strategy announced in 2001 that calls, in the first line of action, for the equipment of schools with technology, establishing a networking platform for teachers and students, empowering teacher trainees with ICT skills, and finally promoting research in high technology (Rochdi, 2001). The programme's mission is also harmonious with Maroc Numeric vision 2020 which targets the promotion of key sectors including administration, governance, trade exchange, telecommunication, etc.[31]. In his latest official meeting with GENIE directorate of December 2018, the Moroccan prime minister invited the directorate to ensure 100% school coverage with desktops or laptops by 2021 and to reconsider the adopted governance model so that periodical evaluations would take place throughout every stage of the programme. These indicators lead to the conclusion that the mandate renewal of the programme is justified and halting the programme, otherwise, would inevitably lead to miscarrying the efforts and budgets invested to digitise the Moroccan school.

**Q: Taking into account the substantial provisions of GENIE programme, what added value is brought about to the Moroccan educational system thanks to GENIE?**

The relevance of GENIE programme may not be entirely justified by its achievements but rather by the typical need to create and sustain an ICTE programme for the Moroccan school. The results of questionnaires, interviews and analysis of official documents and statistics approve the idea that the programme contributed tangibly to enhancing ICT infrastructure at schools (outputs) by means of MMRs,

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[31] See https://www.medias24.com/maroc/economie/165825-les-points-cles-du-plan-maroc-numerique-2020.html

multimedia briefcases, and "limited" internet connection. However, there has been a quasi-unanimity that the usage of apparatus is often disrupted leading to poor yield at the level of learnings (outcomes). The study, in its attempt to unravel the potential causes, lists many related anomalies such as missing visibility, administrative bureaucracy, weak qualification of teachers, limited digital resources, helpless or lacking maintenance and networking… Although the teachers and students acknowledge that ICTs help in the learning process, they do not attribute the attitude to GENIE, nor do they provide any strong evidence that technology, in general, enhances the students' scholastic performance and productivity in the classroom. The study also concludes that GENIE's ICT trainings dedicated to teachers are of mediocre added value due to their heavy focus on word and data processing software promoted by Microsoft. MSP and language teachers testified that GENIE trainings in their current form may not have a great impact on their professional performance at school; consequently, they are probably of more relevance to ICT teachers. GENIE alumni, except ICT teachers, were presented a mini quiz that assesses their familiarity with current ICT trends. The results revealed that despite their participation in the trainings, they still endure an acute weakness at the level of updates as they ignore key notions that constitute the core of similar e-learning workshops elsewhere.

**Q: Does GENIE operate in accordance with the initial road maps set by the ministry of education?**

The study, along with other reports, concludes that the programme was victim of limited planning and visibility. To begin with, the programme was intended to last for only 3 years between 2006 and 2008, to end up taking 12 years (to date) and probably will continue to exist until 2030. The 2008 moratorium conducted by IT Consulting revealed that the programme was barely able to realise 25% of its initial

objectives. The programme's three axes of operation (infrastructure, training, digital resources) scored low on the execution rates and, ultimately, did not meet the expectations of interested parties who could not help bearing in mind the colossal investment of 1038 Million MAD (~130M US$) for the start-up phase only. Our study acknowledges that GENIE II and GENIE III, with the financial boost from the Urgency Plan, helped the programme to relatively overcome certain issues relative to infrastructure (especially MMRs and multimedia briefcases), yet the interviews and questionnaires conducted in this study reveal that GENIE remains away from achieving the ministry's 1999 ICTE vision. The problems showcased in the analysis chapter, especially those related to training, digital resources and development of use, would certainly inhibit the attainment of the seven-objective plan declared by the ministry of education in 1999 that aims at making the learning process flexible, accessible, equitable, affordable, extendable, collaborative and exchangeable.

**Q: What is the academic framework within which GENIE operates? If there is any, to what extent does the programme abide by it?**

One of the programme's biggest pitfalls, especially in the training axis, is being conceived by foreign IT companies, namely Intel and Microsoft whose IT engineers and technicians are missing the academic background. The datum can explain why GENIE directorate, focused more on the axis of infrastructure in GENIE I and ignored the other axes. For instance, trainings before 2010 were ushered by general outlines; the coaches had to improvise the workshop material, methodology, timing, etc. A standard training methodology was conceived in 2010 in which the Change Management approach is explicitly stated for the first time as an academic framework for the programme. The study, however, concludes that the mechanisms by which GENIE runs the 4 axes of operation endure either a superficial

understanding of the CM approach or a complete negligence of its imperatives. The mediocracy of GENIE I outcomes and the testimonies of our directly concerned interviewees confirm the hypothesis that the planning phase was chaotic. The criticism addressed to GENIE II and III by scholars, ministry officials, organisations and the Court of Audit disclose the control weakness throughout the execution phase after targeting mainly the purchase and installation of apparatus. As GENIE alumni deny the existence of administrative support or follow-up visits upon completion of their trainings, one may argue that the stage of maintaining change has been a bit disregarded. The NOICTEU, being the department in charge of usage development was qualified to undergo this mission, but, instead, it was assigned to conduct "soft" internal evaluations and pay exclusive "inspection" visits to ICT teachers.

**Q: What are the students and teachers' attitudes towards GENIE?**

The questionnaires and interviews conducted with the students' population in 4 public schools revealed their ignorance of what GENIE programme is about. Most of them never had access to the MMR except for ICT classes. Thus, most questions revolved round their attitude towards technology in the classroom and beyond, and their reaction towards their teachers' ICTE usage since many of them are GENIE alumni.  Generally, the topic of ICT managed to gain the students' attention during the interviews, questionnaires and the sample demo lesson presented to them. The observation has been confirmed by teachers who mentioned motivation as a short run gain of ICT use in the classroom. Students have also, and more remarkably, demonstrated more openness to social media and m-learning as alternative sources of knowledge. They, however, expressed their lack of familiarity with digital resources provided by GENIE and the NLDR via its platform "taalimtice.ma". GENIE alumni teachers who happened to be a minority of 83 participants expressed a quite

ambivalent attitude towards the programme and its trainings particularly. Interviewees broke even as for their overall satisfaction with GENIE trainings; 50% of N were satisfied, but 50% others were not. While only one out of five teachers thinks that the programme helped them improve their ICT competencies, the others are either partially or fully convinced that the training was not of much utility. Part of this attitude was likely amplified by the fact that organisational support is missing, especially for non-ICT teachers. Since the newly acquired behaviour is not internalised and reinforced enough by the ministry, the teachers' performance is likely to relapse, and they would stick to their dated routines. Despite the majority's belief that the training was irrelevant to their classroom needs, they remained positive by expressing their readiness to take similar courses in the future.

**Q: To what extent are the official bulletins and press communications released by GENIE directorate reflective of the reality in the terrain?**

A considerable amount of time was dedicated to the analysis of official documents issued by GENIE especially those that communicate the progress rates such as the 2008 moratorium, the 2012/2013 and 2014/2015 internal evaluations and the 2016 Agadir conference paper. The moratorium conducted by IT Consulting in 2008 presented highly accurate data about coverage, budget rubrics and outputs. Even though the findings were a bit striking to the parties entrusted with the execution of the programme, they served as a strong and credible foundation to be invested by interested bodies, particularly the Court of Audit. The data presented in the 2013 and 2014 evaluations conducted by the NOICTEU incorporated several anomalies. Exclusion of the teachers' feedback, opacity of certain variables, conflicting and divergent results are the most important issues that characterise these reports. The fact that the evaluations were conducted only one year apart under the urgency of the

ministry by an insider department should eventually jeopardise the outcomes of these evaluations. The 2016 GENIE paper incorporated data that contradicts with our findings especially at the level of hardware coverage and training percentage. By comparing the statistics announced by the ministry of education, particularly those relevant to the number of schools with the number of available MMRs and multimedia briefcases for the same year (2015), we would find that the coverage rate is less than 45% while GENIE announces that it reaches 60%. The same GENIE paper claims that 100% of the ministry's staff received a training on ICT, while two thirds of our population deny taking part in such trainings. Last but not least, the document refers to three internal evaluations conducted by GENIE between 2012 and 2015 while in fact GENIE's NOICTEU conducted only two; the first was initiated in 2012 and ended in 2013, and the second started in 2014 and ended in 2015. These contradictory, or mismatching, figures may not serve the promotion of an honourable facade about GENIE and ICTE policies in Morocco.

All in all, the author still believes that GENIE, being the embodiment of Morocco's bid on ICT in education, is a promising programme that requires prompt and candid redress. The programme benefited from sufficient resources that were not accompanied by sufficient strategic planning. I also believe that in the midst of a fractured educational system in Morocco, it would sound a bit peculiar to await miraculous solutions to the spreading sicknesses from technology alone. Probably the recommendations of this study would not take effect until there is a collective impulse to mend the gaps of the whole system that is falling apart. In the same context, Hassan Aourid (2018), the Moroccan writer and historian thinks that technology available in the field of education is but a part of the solution to the problems of education in our country. *« Technological solutions can be part of the solution and can be relied on to*

*facilitate the teaching process and to reduce the burden of heavy bags and dated*

*syllabi through the adoption of tablets and interactive digital curricula». (translation)*

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- Table 28. Q: Did you verify this progress yourself?

- Table 29. Q: Are you familiar with MOOCs?

- Table 30. Q: Are you familiar with E-learning?

- Table 31. Q: Are you familiar with M-learning?

- Table 32. Q: Are you familiar with LMS?

- Table 33 Q: Are you familiar with Moodle?

- Table 34. Q: How often is the MMR used by your MSP & Language teachers?

- Table 35. Q: Do MSP & L teachers use technology in their classrooms?

- Table 36: Correlation of ICT use and m-learning

- Table 37. Q: Are the mobile gadgets allowed in the classroom for educational purposes?

- Table 38. Q: Do you use your mobile phone for educational purposes (at home)

- Table 39. Q: Do you think ICT enhances your productivity at school?

- Table 40: Correlation of MMR frequency of use and grades

Students' Questionnaire

1. ما مستواك الدراسي؟

_____

2. أين تدرس حاليا

مجال حضري          مجال قروي

3. هل سبق لك أن درست بمؤسسة خاصة؟

نعم        لا

4. إن كان جوابك بنعم فكم من سنة؟

أقل من ثلاث سنوات        أقل من 5 سنوات        أكثر من 6 سنوات

5. هل تتوفر على حاسوب في المنزل؟

نعم        لا

6. هل يتوفر منزلكم على ربط بشبكة الأنترنت؟

نعم        لا

7. هل تتوفر على هاتف ذكي؟

نعم        لا

8. كم كان معدل نجاحك في السنة الفارطة على 20؟

أقل من 10    بين 10 و 11.99    بين 12 و 13.99    بين 14 و 15.99    أكثر من 16

9. كم كان معدلك خلال الدورة الأولى من السنة الحالية؟

أقل من 10    بين 10 و 11.99    بين 12 و 13.99    بين 14 و 15.99    أكثر من 16

10. هل تستخدم مكتبة المؤسسة في إنجاز بحوث تربوية والاستعداد للامتحانات؟

دائما    غالبا    أحيانا    نادرا    أبدا

11. هل تستخدم الانترنت في إنجاز بحوثك المنزلية؟

دائما    غالبا    أحيانا    نادرا    أبدا

12. إن كان جوابك نعم، هل تستخدم مواقع التواصل الاجتماعي مثل Facebook و Twitter و Instagram لأغراض دراسية (تعلم أشياء جديدة/إنجاز البحوث/تواصل مع الزملاء في أمور دراسية)؟

دائما    غالبا    أحيانا    نادرا    أبدا

13.     من بين المواقع التالية أيها تجده أكثر إفادة لك في دراسة المواد العلمية واللغات؟ كيف؟

        **Facebook**            **Youtube**          **Wikipedia**

مواقع أخرى (أذكرها : _____)

14.     هل تتصفح مواقع تربوية تابعة لوزارة التربية الوطنية ؟ (غير تطبيق متمدرس)

نعم (أذكرها _____)

لا

15.     إن كان لك هاتف ذكي، هل توظفه لأغراض دراسية؟ كيف؟

أبدا         نادرا         أحيانا         غالبا         دائما

_____

16.     هل يُسمح لك باستخدام هاتفك لأغراض دراسية داخل الفصل؟ كيف؟

نعم _____

أحيانا _____

أبدا

17.     هل تعتقد بأن التكنولوجيا تحسن من مردوديتك التعليمية؟

لا أعلم         لا         نعم

18.     هل تعتقد أن التكنولوجيا ضرورية داخل الفصل؟

أبدا         نادرا         أحيانا         غالبا         دائما

19.     إن كان جوابك نعم، كيف تعتقد أنها تساعدك؟

السرعة السهولة الكم التحيين الكلفة كل ما سبق

20.     عادة هل تستطيع إنجاز بحث مدرسي دون اللجوء للتكنولوجيا؟

لا أعلم         لا         نعم

21.     هل يَستخدم أساتذة اللغات الأجنبية والمواد العلمية أدوات تكنولوجية داخل الفصل؟

أبدا         نادرا         أحيانا         غالبا         دائما

22.     هل يستخدمون هواتفهم الذكية لأغراض دراسية داخل الفصل؟

أبدا         نادرا         أحيانا         غالبا         دائما

23.     هل يتوفر أساتذة اللغات الأجنبية والمواد العلمية على صفحات تواصلية مع التلاميذ؟

دائما غالبا أحيانا نادرا أبدا

24. هل تتوفر مؤسستكم على قاعة متعددة الوسائط؟

نعم لا

25. إن كان جوابك نعم، هل يتم استخدامها من طرف <u>أساتذة اللغات الأجنبية والمواد العلمية؟</u>

دائما غالبا أحيانا نادرا أبدا (لماذا؟ ـــــــــــــــــــــــــــــــــــــــــــــــ)

26. هل تتوفر مؤسستكم على صفحة بالأنترنت؟

نعم لا

GENIE Alumni Questionnaire (Google Forms Version)

# تقييم برنامج جيني 2006/2018

يهدف هذا الاستبيان إلى مراجعة تدريبات GENIE في المغرب. سيتم استخدام الإجابات لإجراء تقييم للبرنامج فقط ولن تتم مشاركتها بأي شكل مع طرف ثالث. إن كان لك سؤال أو ملاحظة ، فلا تتردد في التواصل معي على صفحتي على Facebook أو البريد الإلكتروني <u>ismailijalal@gmail.com</u>. شكرًا لكم مسبقا

*Obligatoire

1.  **النيابة** *

    _____

2.  **وسط العمل** *
    *Une seule réponse possible.*

    ( ) حضري
    ( ) قروي

3.  **المؤسسة**
    *Une seule réponse possible.*

    ( ) إعدادية
    ( ) ثانوية

4.  **مهاراتك في التكنولوجيا**
    *Une seule réponse possible.*

    ( ) بسيطة
    ( ) متوسطة
    ( ) جيدة
    ( ) ممتازة

5.  **خبرتك تمتد ل**
    *Une seule réponse possible.*

    ( ) أقل من 5 سنوات
    ( ) بين 5 و 10
    ( ) بين 10 و 15
    ( ) أكثر من 15 سنة

6.  **متى استفدت من تكوين جيني**

    _____

## على مقياس من 1 ل 5 كيف تقيم ما يلي

1 غير راضي تماما      5 راضي تماما

**ظروف التكوين**
7.
*.Une seule réponse possible*

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ |

**مدة التكوين**
8.
*.Une seule réponse possible*

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ |

**التفاعل مع المشرف على التكوين**
9.
*.Une seule réponse possible*

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ |

**بنية التكوين (وسائل الراحة، الجهيزات إلخ)**
10.
*.Une seule réponse possible*

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ |

## المحتوى

**كيف تقيم مهاراتك التكنولوجية بعد التكوين؟**
11.
*.Une seule réponse possible*

- ◯ ضعيفة
- ◯ متوسطة
- ◯ جيدة
- ◯ ممتازة

**هل أحسست بأي تحسن على مستوى معارفك التكولوجية؟**
12.
*.Une seule réponse possible*

- ◯ لا
- ◯ ليس كثيرا
- ◯ بالتأكيد

**هل كان المحتوى جديدا بالنسبة لك؟**
13.
*.Une seule réponse possible*

- ◯ لا
- ◯ شينا ما
- ◯ بالتأكيد

14. **ماذا كان محتوى التكوين؟**
*Une seule réponse possible.*

( ) برامج المكتبيات (word, exel, powerpoint)
( ) برامج تربوية
( ) برامج الألعاب
( ) برامج أخرى

15. **هل تود الانخراط في تكوينات مشابهة مستقبلا؟**
*Une seule réponse possible.*

( ) بالتأكيد لا
( ) ربما
( ) بالتأكيد نعم

16. **لماذا؟** *

_____
_____
_____
_____
_____

# الفصل الدراسي

17. **هل كان للتدريب أي فائدة في القسم؟**
*Une seule réponse possible.*

( ) لا
( ) ليس كثيرا
( ) إلى حد ما
( ) نعم بالتأكيد

18. **هل توظف التكنولوجيا داخل الفصل؟**
*Une seule réponse possible.*

( ) لا أبدا
( ) نادرا
( ) أحيانا
( ) دائما

19. **كيف/لماذا؟** *

_____
_____
_____
_____
_____

20. **هل غير التكوين من نظرتك لأهمية التكنولوجيا في الفصل؟**
*Une seule réponse possible.*

◯ لا
◯ ليس كثيرا
◯ نعم

21. **هل تستغل قاعة جيني متعددة الوسائط؟**
*Une seule réponse possible.*

◯ أبدا
◯ نادرا
◯ أحيانا
◯ دائما

22. **إن جوابك لا أو نادرا علل إجابتك**

_____
_____
_____
_____
_____

## التلاميذ

23. **هل تعتقد أن تكوينك في إطار جيني انعكس على تحصيل تلاميذك و على علاماتهم؟**
*Une seule réponse possible.*

◯ لا
◯ ليس كثيرا
◯ نعم

24. **باستثناء رفع حماستهم للتعلم هل تعتقد أن التكنولوجيا تحسن مدارك التلاميذ في المدرسة؟**
*Une seule réponse possible.*

◯ لا
◯ ليس كثيرا
◯ نعم

25. **كيف/لماذا؟**

_____
_____
_____
_____
_____

26. **هل تنصح بهكذا تكوين لزملائك؟**
*Une seule réponse possible.*

○ لا

○ نعم

# اختبار

27. **من بين العبارات التالية اختر تلك التي لك إلمام بها** *
*Une seule réponse possible.*

○ MOOCs

○ E-learning

○ M-learning

○ LMS

○ Moodle

28. **إن كان لك ملاحظة أو تعليق أو توصية بخصوص برنامج جيني المرجو وضعها هنا**

_____

_____

_____

_____

_____

Mass Teachers Questionnaire (Available in English and Arabic)

I-    General Information

1.  Are you?

A male            A female

2.  For how long have you been teaching?

Less than 5 years    Between 5 and 10        Between 10 and 15              More than 15 years

3.  What subject do you teach?

Languages

Computer Science (ICT)/Technology

Maths/Physics/Science

Other subject

4.  Have you ever been assigned to teach a subject other than your specialty?

Yes            No

5.  Where do you teach?

Middle school        Secondary school

6.  Do you teach in?

Urban area        Rural area

II-    ICT

7.  How do you assess your computer skills?

Excellent        Good        Average Weak        Very weak

8.  Do you use a computer/laptop in your classroom?

Always        Often        Sometimes            Rarely        Never

9.  Does your school have a multimedia room?

Yes            No

10. If yes, is it the same technology/ICT room?

Yes            No

11. Do you use it?

Always        Often        Sometimes            Rarely        Never        NA

12. Does your school have access to the internet?

          Yes     No

13. Do you use your smart phone for educational purposes in the classroom?

 Always    Often    Sometimes    Rarely    Never

14. Do you allow your students to use their mobile phones for educational purposes in the classroom?

 Always    Often    Sometimes    Rarely    Never

15. Why?

    _____

16. Did you benefit from a GENIE training course?

          Yes     No

17. If yes, do you think the training was helpful?

Strongly agree    Agree    Not sure    Disagree    Strongly disagree

18. Have you ever received an ICT training by specialized associations?

          Yes     No

19. Do you think ICT is important in the classroom?

Strongly agree    Agree    Not sure    Disagree    Strongly disagree

20. Do you think the students perform better (in exams) with technology?

          Yes     No

21. If yes, how?

    _____

22. Have you tested that yourself?

          Yes     No

23. If yes, how?

    _____