Quest Journals
Journal of Research in Mechanical Engineering
Volume 11 ~ Issue 4 (Jul. – Aug. 2025) pp: 01-07
ISSN(Online):2321-8185
www.questjournals.org

Research Paper

Training Engineering and the Development of Practical Skills in Teacher Trainees : A Study Conducted in General Education Teacher Training Colleges in the Far North Region of Cameroon.

Joseph NJIOMO
University of Maroua, Cameroon

Abstract
Training for the teaching profession is arguably a crucial issue for a society that aspires to be more just and humane, while also being capable of meeting current constraints and demands. Teacher Training Colleges (Écoles Normales) are the quintessential places for training trainers, whose skills must be both theoretical and practical. This article aims to examine the link between training engineering and the development of practical skills in teacher trainees in General Education Teacher Training Colleges. The question posed is : how can training engineering facilitate the development of practical skills in teacher trainees in General Education Teacher Training Colleges in the Far North ? A theoretical model was mobilized, namely the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). In a quantitative approach, our study targets teacher trainees and teachers in General Education Teacher Training Colleges. The methodology is based on the collection of factual data using a questionnaire administered to 50 teacher trainees from a stratified random sample. The analysis, using the ADDIE model, shows that training engineering facilitates the development of practical skills in teacher trainees in General Education Teacher Training Colleges. Thus, training engineering can greatly improve the practical skills of teacher trainees by creating a coherent structure for the acquisition of knowledge and practical qualifications, while encouraging the active participation of learners in their own learning.
***Keywords** : Training engineering, Development, practical skills, ADDIE model, SAM model.*

Résumé
La formation au métier d'enseignant est probablement un enjeu crucial pour une société qui se veut plus juste, plus humaine en même temps que susceptible d'être à la hauteur des contraintes et exigences actuelles. Les Ecoles Normales sont le lieu par excellence de formation des formateurs, dont les compétences doivent être autant théoriques que pratiques. Cet article vise à examiner le lien qui existe entre l'ingénierie de formation et le développement des compétences pratiques des élèves-maîtres des Écoles Normales d'Instituteurs de l'enseignement général. On s'est donc posé la question de savoir comment l'ingénierie de formation peut permettre le développement des compétences pratiques des élèves-maîtres des Écoles Normales d'Instituteurs de l'Enseignement Général de l'Extrême- Nord? Un modèle théorique a été mobilisé, à savoir le modèle ADDIE (Analyse, Design, Développement, Implantation et Évaluation). Dans une approche quantitative, notre étude cible les élèves-maîtres et les enseignants des Écoles Normales d'Instituteurs de l'Enseignement Général. La méthodologie se fonde sur le recueil des données factuelles à l'aide d'un questionnaire administré auprès de 50 élèves-maitres issus d'un échantillonnage aléatoire stratifié. L'analyse montre, grâce au modèle ADDIE que l'ingénierie de formation permet le développement des compétences pratiques chez les élèves-maîtres des Écoles Normales d'Instituteurs de l'Enseignement Général. Ainsi, l'ingénierie de formation peut grandement améliorer les compétences pratiques des élèves-maîtres en créant une structure cohérente pour l'acquisition des connaissances et des qualifications pratiques, tout en encourageant la participation active des apprenants dans leur propre apprentissage.
***Mots clés :** Ingénierie de formation, Développement, compétences pratique, modèle ADDIE, modèle SAM.*

***R**eceived 09 July, 2025; **R**evised 21 July, 2025; **A**ccepted 23 July, 2025 © The author(s) 2025.*
P**ublished with open access at **www.questjournas.org

I.Introduction, Context, and Problem Statement

The evolution of the concept of practical skills in education is the result of a long transformation of pedagogical approaches, influenced by various schools of thought and the changing needs of society (Perrenoud, 1997 ; Le Boterf, 2011). The practical skills of primary school teachers in Cameroon encompass a set of essential know-how and abilities to ensure quality teaching and promote student learning. Thus, to develop the practical skills of teacher trainees, increasing emphasis is placed on the reflective content Of training and its effectiveness for these trainees. It is in this sense that we speak of the professionalization of teaching, which aligns with the needs of our environment. To this end, with the aim of fostering a better learning experience for learners, the training institution must emphasize the training model to be adopted in order to clearly determine the practical skills to be developed, which must, of course, be learner-centered. We will thus speak of training engineering aimed at creating or improving the practical skills of learners (Fonkoua, 2001).

Training engineering is an increasingly essential concept in business, workshops, and the field of education. The educational aspect holds our attention, specifically its impact on the development of new training models. The emergence of this concept has caused changes in all elements that constitute society, notably education and training. As Le Boterf (1990) rightly pointed out, training engineering refers to a coordinated set of activities enabling the mastery and synthesis of information necessary for the design and implementation of a training system with a view to optimizing the investment it contains and ensuring the conditions for its visibility. In other words, training engineering aims at the development and planning of a set of activities based on a well-defined content for the training of learners by eliciting, through precise methods, the development of a set of skills.

Furthermore, public policies worldwide are increasingly concerned with finding ways to promote lifelong education and training (OECD, 1996 & UNESCO, 1996). Africa is entering an era that, according to most observers and experts, will determine its destiny and make it the continent of the future. This promise of a bright future can only be realized if the continent reconciles with its education and training systems, which still carry the heavy burden of their colonial heritage, as well as the weight of their own tribulations as a new political and economic entity and a young actor in the global arena (CESA, 2016-2025). Decision-makers and trainers are constantly reflecting on how to better develop learning among learners. Moving from traditional approaches to active approaches, the participation of all training stakeholders is a concern (Djeumeni, 2015). Thus, the training context in Cameroon is mainly marked by the diversity of training options. However, these trainings do not always meet the expectations of the world of work. Often, they do not adequately equip learners with the skills to face the difficulties awaiting them in the field. In our training schools, the defined programs do not always focus on the learner. The latter finds themselves at the end of their training with a diploma in hand but lacking skills, especially the practical ones expected of them after recruitment. Despite the efforts of the educational authorities to remedy this, this problem remains all the more relevant in training schools that very often propose models different from reality and, on the contrary, do not sufficiently emphasize the practical aspect of the learner.

Consequently, the emerging context in which the Cameroonian State aligns itself requires competent human capital. To this end, it is imperative for our various training schools to train individuals capable of effectively meeting the future needs of our nation. However, it is evident, particularly with the COVID-19 crisis, that our schools are far from responding effectively when faced with such difficulties. This also applies to the General Education Teacher Training Colleges in the Far North, whose curriculum does not emphasize concrete everyday life activities (as confirmed by 70% of teacher trainees surveyed during our preliminary investigation in February 2024). This would allow participants to learn by doing. Consequently, it is not surprising to note that these schools face difficulties in developing practical skills, which elsewhere are based on action research. Moreover, we have observed that in the teaching and learning process, not all learners feel equally at ease. Even in the field, during practical internships, their actions are more abstract than concrete.

However, normally in General Education Teacher Training Colleges, emphasis should be placed on practical skills, which are a creative method of problem-solving. Here, the learner's needs and problems, and the learner themselves, are at the center of learning (Tchamabe, 2015). To develop practical skills in all learners, we will need to involve training engineering. The latter undoubtedly applies participatory learning methods and takes into account the needs and problems of training stakeholders (Le Boterf, 2011). To this end, this study will examine the development of practical skills in these General Education Teacher Training Colleges, in light of training engineering, under three concepts : defining training needs, designing a training project, and managing and facilitating training. To do this, the main research question is as follows : does training engineering facilitate the development of practical skills in teacher trainees ? Secondarily, do defining training needs, designing a training project, and managing and facilitating training determine the development of practical skills in teacher trainees ?

II.Main Concepts and Analysis Models

To shed some light on the problem of developing practical skills in relation to training engineering, certain concepts require in-depth analysis. According to Carré (2003, p. 63), training engineering can be defined as : « The coordinated set of activities for designing a training system (training device, training center, training plan, educational resource center, distance learning system, trainer networks, resource network…) with a view to optimizing the investment it represents and ensuring the conditions for its viability. » Le Boterf (1990), for his part, states that training engineering is the coordinated set of activities for designing a training system (curriculum or training cycle, training center, training plan, educational resource center, session or internship…) with a view to optimizing the investment it represents and ensuring the conditions for its viability. For the latter, training engineering is considered a socio-professional approach that consists of analyzing, designing, implementing, and evaluating training actions, systems, and/or devices, taking into account the environment and professional actors. The objectives pursued include : mastering and synthesizing the information necessary for the design and implementation of a training system, optimizing investment in training, ensuring the viability of the training system, and bridging the gap between a real situation and a desired situation. Viallet (1987, p. 14) in his work distinguishes four categories of training engineering : engineering concerning the design of an entire system or a target group and aiming to generate future professionals (creation of University Institutes of Technology) ; engineering of the continuous training system within a company or organization ; engineering aimed at rehabilitating a training practice facing dysfunctions, loss of effectiveness, or a crisis of relevance in its missions ; and engineering consisting of making the workplace an « educational environment. » Any change, technical, organizational, or social innovation must be thought out in such a way that the people concerned have been able to make their effective contribution. In the context of this article, training engineering is the application of the principles and techniques of computer science and pedagogical engineering to learning environments to produce more effective, more adapted, and more user-friendly systems.

As for practical skills, they refer to a person's abilities to perform specific tasks effectively and productively (Boyatzis, 1982). They encompass a person's knowledge, skills, and behaviors that enable them to succeed in a professional environment. They are increasingly understood by different researchers according to the « teaching practices » approach and the « professional skills » approach. The latter approach emphasizes the set of knowledge, know-how, and interpersonal skills necessary for the profession. It draws inspiration from definitions such as those of Anderson (1986), who speaks of « knowledge, skills, and attitudes necessary to ensure the tasks and roles of the teacher. » Researchers such as Le Boterf (2001), Legendre (2007), Paquay (2002b), and Perrenoud (1997) have contributed to defining professional skills as a set of resources mobilized to deal with problem situations. Tardif (2006), for his part, emphasizes « know-how to act, » i.e., the ability to effectively use a set of resources. These different approaches highlight the complexity of teachers' practical skills, which encompass both theoretical knowledge, technical know-how, and relational qualities.

The theoretical grounding of this study is based on the ADDIE model, which is the historical model in e-learning training engineering. More than 100 e-learning engineering models are based on the ADDIE model, with variations and adjustments here and there (HAS, 2015). This model is broken down into five phases:

Step 1 : Analysis. This phase consists of clarifying and analyzing different aspects that condition pedagogical choices (training context ; training objectives ; risks, opportunities for this project ; constraints related to content, deadlines, technique ; learners, characteristics, prerequisites, needs ; geographical location of learners and access to technologies).

Step 2 : Training Design or pedagogical scripting (storyboard). This phase consists of specifying the learning objectives and the targeted skills, as well as the content elements that will be covered during the training. It also involves defining the pedagogical scenario (storyboard) and the mediatization of the training. It relies on documentary analysis and experts. The activities to be carried out in this phase are (translation of training objectives into learning objectives ; analysis of the training content ; definition of the training structure and pedagogical sequences ; specification of the activities to be carried out according to the sequences and the audience ; specification of the duration of the training and the pace of the training ; assessment of development costs ; definition of the evaluation methodology, evaluation methods, and tools ; definition of the implementation strategy).

Step 3 : Development (production or realization). This phase consists of producing the necessary resources : e-learning modules, videos, etc. It also involves producing all the complementary documents for the training : plan, guides, etc.

Step 4 : Implementation. This phase consists of making the training available to learners : (installation on a training platform ; messages, instructions for learners ; preparation of training tutors ; registration and monitoring system ; learner schedules).

Step 5 : Training Evaluation. This phase consists of checking that the training objectives are achieved by analyzing the different dimensions of the training in order to improve it. Two main types of evaluations aim at evaluating the impact of the training on the learner on the one hand and evaluating the training system on the

other hand. The « ADDIE » model has attracted our attention among many others because it particularly emphasizes the definition of the training or learning problem that one seeks to solve before developing the training solution. The actors involved in this model vary depending on the context and the scale of the projects. Responsibility for the process lies with one or more e-learning pedagogical engineering specialists. These are the specialists who intervene in the different phases of the project. The criticisms made of this approach revolve around a model that is : too systematic ; too linear ; too constraining ; too time-consuming. Nevertheless, it remains effective and adapted to the Cameroonian context. The SAM (Successive Approximation Model) could have been used, but it is more complex for beginners (in the case of teacher trainees) to grasp than the ADDIE model, and the management of the completion time depends on the objectives and the interlocutors. Moreover, the SAM model, with its iterative and flexible approach, may be confusing for teacher trainees who need a more linear and guided structure, and especially to have enough time for learning.

III.Methodology

The population of this research consists of teacher trainees from the General Education Teacher Training Colleges in the Far North region of Cameroon. This region has six public General Education Teacher Training Colleges. As for the accessible population, it consists of all teacher trainees from the Maroua General Education Bilingual Teacher Training College. The study sample was obtained based on the stratified sampling technique (teacher trainees being distributed by level of study). Our sample size is 50 teacher trainees. Data collection was done through a questionnaire. These questions concern the socio-demographic information of the respondents, the definition of training needs, the design of a training project, the management and facilitation of training, and the development of practical skills. The Likert scale was used extensively. The preliminary survey took place at the Maroua General Education Bilingual Teacher Training College in November 2024, and the actual survey took place in December 2024. To analyze the data collected for this research, we used descriptive statistics (calculation of frequencies and percentages) and content analysis (cross-tabulations, categorization of respondents' opinions).

IV.Results and discussion

From the Definition and Satisfaction of Training Needs

To the question : « Overall, to what extent are you satisfied with the training you have received ? »

Our results show that 5.7% of respondents are very dissatisfied, and 17.1% are dissatisfied. The reasons given include : the gap between theory and practice (insufficient and often poorly supervised practical internships, a lack of practical application of the concepts taught) ; lack of preparation for the realities of the profession (difficulties in classroom management, lack of support in the face of emotional challenges) ; insufficient support and follow-up (insufficient pedagogical supervision, absence of mentoring, lack of constructive feedback) ; training conditions (inadequate premises and equipment, lack of financial resources).

67.1% are satisfied and 10.0% are very satisfied. The reasons given by each group are diverse ; they are related to the quality of the training received and their preparation for the profession. The most relevant include : acquisition of solid skills and knowledge (mastery of disciplinary and pedagogical knowledge, development of practical skills, adaptation to new technologies) ; enriching internship experiences (quality pedagogical supervision, constructive feedback, practical application) ; feeling of preparedness for the profession (confidence in their abilities, clarity on professional expectations) ; quality of support and follow-up (support from supervisors, positive relationships with peers) ; personal factors (personal fulfillment, feeling of usefulness, passion for teaching).

Regarding the question on the competency frameworks for teacher trainees, 25.7% of respondents are dissatisfied, 60.0% are satisfied, and 14.3% are very satisfied. Indeed, in Cameroon, the competency frameworks for teacher trainees are part of a professionalization approach to the teaching profession, with particular attention paid to the competency-based approach (APC). These competency frameworks are governed by Law No. 98/004 of April 14, 1998, on the orientation of education in Cameroon, which defines the missions of education. The expected professional competencies include : disciplinary, pedagogical, relational, and ethical competencies, and professional development.

From the Design of a Training Project as a Guarantee for the Development of Teacher Trainees' Practical Skills

The results on the link and coherence between the teaching sequences as conceived in the training project indicate that 5.7% of respondents are very dissatisfied and 41.4% are dissatisfied. The training project for teacher trainees focused on the development of practical skills is essential to effectively prepare future teachers to meet the challenges of modern education. Dissatisfied respondents believe that the training project does not sufficiently integrate the various elements that contribute to the development of their practical skills. The lack of coherence between the content of the programs and the teaching sequences are examples of this.

We also note that 45.7% are satisfied and 7.1% are very satisfied. From these results, we observe that the majority of respondents are satisfied with the link and coherence between the teaching sequences. Coherence between teaching sequences ensures a logical and significant progression of learning, avoiding unnecessary redundancies and detrimental gaps. This coherence is essential as it facilitates learning, optimizes teaching time, develops transversal skills, and optimally prepares future teachers. By clearly explaining this coherence to teacher trainees, they will have a comprehensive and precise overview of their training. This explains their satisfaction.

The results on the quality of the objectives pursued by the training indicate that 5.7% of respondents are very dissatisfied, and 32.9% are dissatisfied. Indeed, if the training objectives are not clearly defined, or if they do not correspond to the skills actually expected of teachers, teacher trainees may feel lost and dissatisfied. Some teacher trainees believe that the objectives do not sufficiently take into account the evolutions of the education system, new technologies, or the specific needs of certain students. This notably concerns inclusive education, which is more of a declaration than a practical implementation. Their dissatisfaction also finds its explanation in the inconsistency between the different training modules, or between the expectations of teachers and those of the field, which leads to a feeling of frustration. The training of teacher trainees should take into account the different profiles and needs of the latter, by providing opportunities for specialization or in-depth study in certain areas such as the didactics of French and mathematics.

The Management and Facilitation of Training to Be Effective Must Be Learner-Centered

The management and facilitation of teacher trainee training encompass a variety of interconnected elements aimed at ensuring an effective and enriching learning experience. We have retained the most relevant ones. The results on the construction of a pedagogical progression indicate that 7.1% of respondents are very dissatisfied and 34.3% are dissatisfied. The dissatisfaction of the latter regarding the management and facilitation of their training can be explained at various levels : a) lack of active participation, which translates on the one hand into a lack of opportunities for teacher trainees to express their opinions, ask questions, and participate in decisions concerning their training, and on the other hand, a feeling of a lack of control over their learning ; b) ineffective pedagogical facilitation, which manifests itself in a lack of variety in facilitation methods as well as boring facilitation techniques ; c) insufficient management of the training, resulting in a lack of clarity in the training objectives and insufficient monitoring of individual progress. In short, the dissatisfaction of teacher trainees very often stems from a lack of active participation, ineffective pedagogical facilitation, insufficient management, a disconnect with the realities of the field, and communication problems.

The results regarding the integration of pedagogical innovations show that 5.7% of respondents are very dissatisfied and 32.9% are dissatisfied. This dissatisfaction can be explained by several factors : a) lack of preparation and support : indeed, pedagogical innovations such as the integration of digital technologies or active learning approaches often require new skills and new ways of thinking ; if teacher trainees are not sufficiently prepared or supported in learning these new methods, they may feel dissatisfied. B) the gap between theory and practice : pedagogical innovations may seem interesting in theory, but their implementation in the classroom can prove complex ; if teacher trainees do not have enough opportunities to practice these new methods in real situations, they may doubt their effectiveness and feel dissatisfied. Moreover, the lack of simulation can prevent teacher trainees from familiarizing themselves with the realities of the field and developing the skills necessary to implement these pedagogical innovations. C) resistance to change : some teacher trainees are attached to traditional pedagogical methods and are therefore reluctant to adopt new approaches ; fear of the unknown, lack of confidence in their own abilities, or fear of failure can lead them to reject pedagogical innovations. D) lack of perceived relevance : indeed, if teacher trainees do not understand the value of pedagogical innovations, or if they do not meet their needs or those of their future students, they may feel dissatisfied. The dissatisfaction of teacher trainees regarding the integration of pedagogical innovations may be linked to a lack of preparation and support, a gap between theory and practice, resistance to change, a lack of perceived relevance, and implementation problems.

Practical Skills Are Essential in Teacher Trainee Training

The dimensions addressed here include : the engagement and active participation of teacher trainees, participation in a learning experience through collaborative learning, creativity and innovation by teacher trainees.

The results on the engagement and active participation of teacher trainees reveal that 5.7% are very dissatisfied and 28.6% are dissatisfied with their engagement and active participation in their training. This dissatisfaction is explained by a multitude of interdependent factors, affecting pedagogical, institutional, and personal aspects. The factors related to the training itself include : the use of inappropriate pedagogical methods, evaluation methods focused solely on the validation of theoretical knowledge and a lack of constructive and personalized feedback ; an excessive workload including internships that are generally poorly supervised and of short duration ; personal work coupled with the numerous subjects taught, generating fatigue and stress.

Institutional factors can be summarized as inadequate material and organizational conditions (overloaded schedules, inadequate infrastructure), an unsatisfactory institutional climate which translates into a lack of support from the teaching team or the administration, or a lack of recognition and appreciation of the efforts of teacher trainees, which sometimes diminishes their motivation. As for personal factors, they are related either to the personal difficulties of teacher trainees (personal, family, financial problems, lack of self-confidence) ; or to the absence of a professional project or a motivational deficit (linked to the fear of job security, for example). All these factors interact and reinforce each other, hence the need for a comprehensive and multidimensional approach to improve the engagement and active participation of teacher trainees.

Regarding participation in a learning experience through collaborative learning, the results show that 10.0% of respondents are very dissatisfied and 40.0% are dissatisfied. Collaborative learning is essential in the training of teacher trainees, as it allows them to develop skills and knowledge crucial for their future careers. The following important aspects were the most frequently mentioned : a) collaborative learning contributes to preparation for the teaching profession through practical experience (offers teacher trainees practical experience of teamwork), networking (connecting with other future teachers and sharing resources), collaboration with other education professionals ; b) collaborative learning facilitates the development of pedagogical and didactic skills through teamwork, effective communication, problem-solving, critical thinking ; c) collaborative learning facilitates the acquisition of knowledge through knowledge sharing, knowledge construction, and the confrontation of ideas ; d) collaborative learning develops social and emotional skills through empathy (it allows teacher trainees to put themselves in the place of their peers and understand their points of view), conflict management, and the strengthening of teacher trainees' self-confidence by giving them the opportunity to share their ideas and receive positive feedback. Collaborative learning thus positions itself as a powerful tool for the training of teacher trainees, as it allows them to develop the skills, knowledge, and attitudes necessary to become effective and engaged teachers.

Regarding the results on creativity and innovation among teacher trainees that this initial training can develop, 5.7% of respondents are very dissatisfied and 27.1% are dissatisfied. To develop creativity and innovation during the training of teacher trainees, it is essential to establish a stimulating and open learning environment. Several strategies can be implemented : a) encourage teacher trainees to explore and take risks by creating a climate of trust, valuing their mistakes, and proposing tasks that encourage them to explore different approaches ; b) promote divergent thinking through the use of brainstorming techniques, the introduction of artistic activities, and the encouragement of associating seemingly unrelated ideas and concepts ; c) integrate technology creatively by : using digital tools to create innovative pedagogical resources and solve pedagogical problems ; d) promote collaboration and the exchange of ideas by setting up group projects, organizing workshops and conferences, and encouraging teacher trainees to participate in online communities of practice ; e) develop critical thinking and problem-solving skills by having teacher trainees analyze case studies, setting up simulations, and encouraging them to reflect on their own pedagogical practices and identify areas where they can improve. The development of creativity and innovation among teacher trainees requires a multidimensional approach that combines exploration, collaboration, technology, and critical thinking.

Training Engineering Plays a Crucial Role in the Development of Teacher Trainees' Practical Skills

This is done through : a) the design of targeted and effective training through : needs analysis, the design of pedagogical scenarios, the selection of appropriate pedagogical methods (simulations, case studies, role-playing, practical internships) ; b) the optimization of resources and means, which involves : rigorous planning, the effective use of technologies, continuous evaluation to measure the effectiveness of training and make necessary adjustments ; c) the development of transferable skills which translates into : real-life simulations (which allow teacher trainees to develop skills directly transferable in the classroom), reflection on practice (which allows teacher trainees to become aware of their strengths and weaknesses and continuously improve their skills), adaptation to varied teaching contexts by giving them the tools and skills necessary to face the challenges of the profession. Engineering takes into account the needs of the field and creates coherence between skills and the realities of the field. It offers learners the know-how and interpersonal skills for a better understanding of learning methods and techniques. It establishes clear learning objectives, well-articulated pedagogical sequences, activities, and evaluations adapted to the target audience.

V.Conclusion

This article aimed to examine the link between training engineering and the development of practical skills in teacher trainees in General Education Teacher Training Colleges. Thus, the main question that guided this work is : does training engineering facilitate the development of practical skills in teacher trainees in General Education Teacher Training Colleges ? To this end, we relied on the ADDIE model, which shows that one must first go through the analysis of training needs, then the design of the training or pedagogical scripting, followed by the development which consists of production or realization, then the implementation or

management of the training, and the evaluation of the training. This research shows that training engineering is an approach that aims to design and implement effective and targeted training programs for learners. It involves the use of proven methods and tools to create learning environments conducive to the acquisition of knowledge and skills. Thus, we suggest that training engineering be at the center of our training schools to have a significant influence on the development of practical skills. Training programs that have been developed through this approach often constitute a structured and coherent framework for learning. They establish clear learning objectives, well-articulated pedagogical sequences, activities, and evaluations adapted to the target audience. By investing in training engineering, we invest in the quality of education and in the success of future teachers.

References

[1]. Boyatzis, R. (1982). *The Competent Manager : A Model for Effective Performance*. Paris : L'harmattan. 330p.
[2]. Carre, P & Caspar, P. (2003). *Traité des sciences et des techniques de la formation*. LIEGE : DUNOD, 338p.
[3]. Dewey, J. (1916). Compétences pratiques : Chapitre 19 de « Democracy and Education », intitulé *« The Nature of Purpose »,* vol. 17, n° 3, p. 140-151.
[4]. Djeumeni, T., M. (2015). La formation pratique des enseignants au Cameroun, *Formation et profession*, 23(3), Université Laval.
[5]. Fonkoua, P. (2001). *La formation des enseignants et le développement durable en Afrique : d'une situation locale à une préoccupation globale*, La formation des enseignants dans la francophonie Diversités, défis, stratégies d'action, 105p.
[6]. Gide, A. (1923), *L'éducation des enfants, la formation ou la direction de l'individu*, Journal.
[7]. Haute Autorité de Santé (2015). *E-learning Guide de conception de formation ouverte et à distance (FOAD) dans le monde de la santé*. Évaluations et amélioration des pratiques. Juin
[8]. Le Boterf, G. (1990). *Ingénierie de la formation*, Éditions d'Organisation.
[9]. Le Boterf, G. (1990). *L'ingénierie et l'évaluation de la formation*, Editions d'organisation.
[10]. Le Boterf, G. (2001). Les facteurs explicatifs de l'internet actuel pour les compétences. *Construire les compétences individuelles et collectives,* pp. 13-27. Paris : Éditions de l'organisation.
[11]. McClelland, D. (1973). Testing for Competence Rather Than for Intelligence. *In Harvard Business Review*. pp 23-37. New York; Praeger.
[12]. OCDE (1996). *Apprendre à tout âge.* Paris: OCDE.
[13]. UNESCO (1996). *L'éducation: un trésor est caché dedans. Rapport à l'Unesco de la Commission internationale sur l'éducation pour le vingt et unième siècle (rapport Delors).* Paris: Unesco.