

Teacher Education

This is the policies or procedures designed to equip a prospective teacher with knowledge, attitudes, Behaviors and skills. They are required to perform task effectively in the classroom, schools and the community.

Teacher education is often divided into three aspects; initial training, induction and teacher's development.

Initial teacher training/education: this is the pre service course before one enters the classroom as a fully responsible teacher.

Induction: this is the process of providing training and support during the few years of teaching or the first year in his particular school.

- It can also include mentoring. Inducting a teacher involved explaining the school vision and procedures.
- Inducting a teacher into the teaching profession involves providing support necessary to help the teachers to develop a professional identity and to develop competences that were acquired in the training colleges.

Teacher development: this is continuing professional development. This is mainly in-service process for practicing teachers.

Teacher education may take two major basic models

Consecutive model: here the teacher obtains qualification (often after a first degree) and then studies for a further period to gain an additional qualification in teaching. This may take the form of post graduate studies in most countries for example, Post Graduate Diploma in Education/ Teaching in Higher Institutions of Learning or even Masters Degrees. It can be referred to as successive teacher training model.

Concurrent model: this is where a student simultaneously studies both one or more academic subjects and the way of teaching that subject, leading to a qualification as teacher of that subject. It is also called parallel model of teacher training.

One can also receive training as a teacher under the responsibility of an accredited experienced practitioner in a school.

Teacher training in a knowledge society

Information and knowledge society is a society based on technological development in which information is considered as good, a society of digital divide, where knowledge in social, ethical and political dimensions contribute to bring equity, justice, solidarity, democracy, peace, etc.

Bernard Cornu states that Information can be facts, comments, opinions expressed through words, images, sounds of a thing; information can be stored, circulated, exchanged, bought and sold. On the other hand,

knowledge is the information, understanding or skills that one draws from learning or experience, it is linked with a person it is the output of a process of reconstruction of information by a person and according to his history and context.

Edward and Usher (2008) cited by Avril Loveless state that the landscape which we are attempting to map is a dynamic and tectonic one in the opening up of pedagogical spaces. This is due to the structural changes that are identified in work, institutions and cultural values to rise to what Florida (2003) called creative class.

Teacher training and teacher education is very crucial issue in educational policies in all nations. This is to address the new context in which teachers must act, that is the knowledge society with the development of collective intelligence.

Since information and knowledge have new status in this age, teacher training should strive to meet the new challenges in education.

The new changes like ICT has not only provided new tools and resources for teaching and learning, but it has changed the knowledge itself, the way of accessing knowledge and it brings new concepts to our societies.

The objectives of teaching should therefore be to

- To prepare the learners for a society in which information and knowledge have a new status and in which digital technologies have a core place.
- Preparing learners to use ICT and computer tools for better learning.
- Prepare the learners for a networked society: this is a knowledge society which presents with a paradigm shift from hierarchical society where things are highly organized in terms of hierarchy. A networked society is one which is evolutive and interactive. Here communication is from all to all other than one to one or one to all as in the hierarchical society. Teachers should be capable of helping the learners to circulate in the knowledge network, to direct them to appropriate paths in the complex network and to validate the knowledge. (Bernard Cornu)
- To encourage learner to have collective intelligence. This is to develop intelligence inside a group through communication. Here, there is collective competence and capabilities, collaboration and memory.

The perspectives of some scholars

Lynn, Bryant and Marc

Begins their presentation by recognizing that we have entered into a new age defined by global economy, and information age. As The political and business world grapple with this changes, their reactions influence higher education by demanding positivistic and pragmatic approaches to planning, pedagogy, and curriculum development. As institutions of higher education respond to the demands arising from knowledge society and as the uncritical use of technologies multiplies, it is crucial that teacher teachers education should be made to respond and clarify their purposes and procedures.

Lyant said that since the scientific revolution and 18th century enlightenment, positivism as a philosophy emerged and influenced education system heavily. Positivism supposes that human behaviors can be understood through categorization and labeling. This looks at the law of human interaction and behavior. This has left many questions unanswered because life or human behavior is very uncertain and unpredictable to be understood simply using the positivistic ways. This implies that approaches to re-examining curriculum, pedagogy and planning in teacher education should arise from alternate ways of thinking. To this effect, Lorenz proposes chaos theory and Collingwood proposed the historical thinking.

Chaos theory is a field of study in mathematics, physics, and philosophy studying the behavior of dynamical systems that are highly sensitive to initial conditions. This sensitivity is popularly referred to as the butterfly effect. Small differences in initial conditions (such as those due to rounding errors in numerical computation) yield widely diverging outcomes for chaotic systems, rendering long-term prediction impossible in general. This happens even though these systems are deterministic, meaning that their future dynamics are fully determined by their initial conditions, with no random elements involved. In other words, the deterministic nature of these systems does not make them predictable. This behavior is known as deterministic chaos, or simply *chaos*.

Chaos theory is the study of nonlinear dynamics, where seemingly random events are actually predictable from simple deterministic equations.

In a scientific context, the word *chaos* has a slightly different meaning than it does in its general usage as *a state of confusion, lacking any order*. Chaos, with reference to *chaos theory*, refers to an apparent lack of order in a system that nevertheless obeys particular laws or rules; this understanding of chaos is synonymous with *dynamical instability*, a condition discovered by the physicist Henri Poincare in the early 20th century that refers to an inherent lack of predictability in some physical systems. Lorenz, a meteorologist, was running computerized equations to theoretically model and predict weather conditions. Having run a particular sequence, he decided to replicate it. Lorenz reentered the number from his printout, taken half-way through the sequence, and left it to run. What he found upon his return was, contrary to his expectations, these results were radically different from his first outcomes. Lorenz had, in fact, entered not precisely the same number, .506127, but the rounded figure of .506. According to all scientific expectations at that time, the resulting sequence should have differed only very slightly from the original trial, because measurement to three decimal places was considered to be fairly precise. Because the two figures were considered to be almost the same, the results should have likewise been similar.

Since repeated experimentation proved otherwise, Lorenz concluded that the slightest difference in initial conditions - beyond human ability to measure - made prediction of past or future outcomes impossible, an idea that violated the basic conventions of physics. As the famed physicist Richard Feynman pointed out, "Physicists like to think that all you have to do is say, these are the conditions, now what happens next?"

The two main components of chaos theory are the ideas that systems - **no matter how complex they may be - rely upon an underlying order, and that very simple or small systems and events can cause very complex behaviors or events**. This latter idea is known as *sensitive dependence on initial conditions* and **extreme sensitivity to influx**. This was a circumstance discovered by Edward Lorenz (who is generally credited as the first experimenter in the area of chaos) in the early 1960s.

Chaos theory represents to us a probability that the future will not merely or simply be a linear extrapolation of past because any small events happening today will cause new patterns to emerge downstream.

What allows the chaotic systems to make sense of pattern with a boundary is the presence of attractors (these are elements in the system which have organizational power) this creates unstable complex patterns because each attractor acts on another. The ability to create order becomes very temporary.

The chaos and complexity theories impact our education in a number of ways including classroom dynamics and operation, pedagogy and its adaptation, brain functioning, curriculum and its revision, functions of leadership, policies and planning.

Collingwood a historian launched a historical thinking approach.

He argued that since there are fundamental differences between history and natural science, there must be different approaches taken to the construction of knowledge in each realm. He said the observation of phenomena or perception and measuring, classifying and generating laws based on observations was legitimate for understanding natural science or nature because the natural world has no inside. But the object of thought for history has fundamentally different character in the eventure nor merely events, but past human actions that have both inside and outside or observable parts and the inside can be described in terms of thoughts. To him, knowing any thing in history involves knowing both sides. The observation or discovering the outside is the first but it should never end there, we must always remember that an event was an action one then has to think about these actions and discern the thoughts. This process is called re-enactment.

This challenges us to think but not just to accept or deliver facts, rules or laws. He condemns summative evaluation of learning in most schools.

The implications are that:

In the world of technology-rich environment the way people learn is complemented by technology. This change makes teachers suffer with chaotic impact of new technologies. They should be equipped with skills to handle the technologies so that their learners can have better opportunities to pursue answers to their 'what' and 'why' questions. This is to assist students develop critical thinking to solving problems in their vicinity.

Teacher education can continue to be in the positivistic thought with the assumption that things could be fixed simply with more and more better planning. But if we keep in mind that human behavior is too complex, unpredictable to be understood by using a positivistic approach, then it is necessary to develop approaches to planning and policy making in teacher education that arise from alternate ways of thinking.

Janet Mansfield

Janet asserts that teacher education in her country New Zealand has been shaken by the sweeping wave of reformative policies emerging from global governance and public practice.

In the world which is characterized by computers, robots and automations, education is instructed to become part of the miracle of production of global economics. The products should become part of the technologised assembly line with a dictate to improve performance. In a bid to achieve the objectives of better education, economic development, human development and environmental sustainability, cooperate governance systems employing cream technology audits regime has dominated education at all levels including teacher education. This exerted a magnetic pull on teachers' spirits, practices and behavior. This calls for the improvement of the quality of teacher education.

Avril loveless

This is a professor of education at the University of Brighton in UK. She teaches post graduate and undergraduate courses but at the same she runs many activities with primary secondary schools on Information and communication technology. She focuses on creativity, new technologies and professional knowledge in education.

Major development thinkers, governments and professional communities engage in consultation about the future of education in terms of its curriculum, pedagogy and tools for teaching and learning beyond the present horizon. Key questions for research, reflection and challenge so as to conceptualize teaching as creative endeavors in need of professional knowledge and confident agency in reading the world with changing landscape.

Critical to note is that the landscape of teacher education is also changing in terms of purpose, policies as well as tool for learning, for example, digital technologies.

Avril would like us to look at teacher learning as renaissance (meaning: taking new interest in something that has not been popular for long) other than retooling. This is to acknowledge teachers as actors in cultural changes rather than instruments re designed when the requirement for production line has changed. The main challenges to education in a knowledge society today are:

- Purpose and values
- Learning and teaching
- Curriculum and assessment
- Quality and standards
- Diversity and inclusion
- Setting and professionals
- Parenting, caring and education
- Beyond the school
- Structures and phases
- Funding and governance

Taking teaching in the knowledge society, Avril seeks to conceptualize teaching in this society as creative endeavors which involve imaginations and values as well as tensions and contradictions. Avril therefore thematized her work in four aspects

- The place of the teacher in the changing landscape of workforce, curriculum and pedagogy
- Teacher's learning with digital tools
- Teacher's as creative professionals

- Retooling or renaissance of teacher education

The place of the teacher in the changing landscape of workforce, curriculum and pedagogy

The landscape (meaning a general situation in which a particular activity takes place) we are attempting to map is a dynamic if not a tectonic one in the opening up of pedagogical spaces. For the last 3 decades, writers and researchers have been predicting social and economic changes. Knowledge society identifies with structural changes on work, institutions and cultural values. Power has shifted to the control of information that has given birth to the so-called creative class.

European commission in assessing the implication of the welfare state restructuring in Europe on teaching and nursing professionals in the context of understanding knowledge at work among the professional actors, identified important questions about the nature of changes in the design and experiences of teacher education.

They noted how the experience of younger teachers and experienced teachers affect the knowledge and wisdom in the teaching community. The teachers professional life reflect shifts in a more materialistic and individualistic society. The young teachers are less resistant to prescription and inspection of pedagogy and curriculum. They are however locked up in the dilemma of tensions and anxieties between contradicting policies for creative integrated approaches within unchanging context of assessment and monitoring.

In the UK education system, rethinking of teaching as a profession is taking place not only in the wider socio-economic context but also against national labor changes and policies about children, families, curriculum, strategies, pedagogy and models of teacher education.

In Uganda, responses are being made on prosperity for all, science for all, every child matters and the role of digital technologies in teaching and learning.

Questions of reflection

Are there any notable changes in the terrain of education or teachers world in Uganda today? If any what could they be?

Teachers learning with digital technology tools

A digital system is a data technology that uses discrete (discontinuous) values. By contrast, non-digital (or analog) systems use a continuous range of values to represent information. Although digital representations are discrete, the information represented can be either discrete, such as numbers, letters or icons, or continuous, such as sounds, images, and other measurements of continuous systems.

The word digital comes from the same source as the word digit and digitus (the Latin word for finger), as fingers are used for discrete counting.

The word digital is most commonly used in computing and electronics, especially where real-world information is converted to binary numeric form as in digital audio and digital

The examples include

Digital technology plays a key role in acceleration of socio-economic and professional aspects of life. To teachers in a knowledge society, they have a didactic relationship with the what, how and why of teaching and learning. They can support and shape teachers own learning and professional development. Most of the digital tools offered to teachers are to transform their practice since they are to intensify efficiency and productivity. They are important for registration, record keeping, access to material/resource, organization of curriculum resources and pupils work as well as monitoring analysis and presentation of performance data.

Apart from being tools in the teaching of the curriculum with the learners, digital technologies can also support and shape teachers' learning.

It builds the teachers' knowledge: adapting and developing ideas; modeling; representing understanding in multimodal and dynamic ways.

It helps the teacher in accessing resources, finding things out, writing, composing and presenting facts.

It enables exchange and sharing of communication extending the context of activities from a particular community to global levels.

It promotes engagement through exploring and playing, acknowledging risk and uncertainty and immediacy in response.

These activities with digital tools help the teachers to be ready, willing and able to teach effectively as they support the vision of education, motivate learning and reflection in a learning community. Teachers and communities therefore are equipped by digital technologies to make informed decision and resist bandwagons or snake oil sellers.

Teachers as creative professionals

Creativity is a person's ability to come up with original idea that has value. It can also be known as imaginative activity fashioned so as to produce outcomes that are both original and valuable.

Teaching can be a creative endeavor for teachers and learners through expressing creative interactions between individuals.

Creative teaching goes hand in hand with creative learning with a by product of creativity of learners because of teaching for creativity.

Teachers need to be able to engage not only with the purposes and place of the content but also with the ways in which such contents is relevant in the learners experience. This requires imagination.

Mapping the landscape –retooling or renaissance?

It seems easier to clear/map the landscape of teacher's education in our times other than letting it go to the horizon beyond us. The current model of teachers education is effective for producing teachers for current systems and strategies but its relevance and authenticity in the growing compels society is challenged. The roles and identities of teacher's informal and informal education settings are being reshaped. This is because the landscape is changing in terms of purposes, policies, tools and environment available for teaching and learning.

Retooling teachers' education is limited and inadequate because it is only attempts to capture copy and disseminate elements of good practice out of the contest in which they have been developed so as to refresh education.

Renaissance of teachers' education aims at a cultural change in the teaching profession which enables high level of agency to deal with complexity and flexibility-intelligent actions in fast changing context. Renaissance compasses seven Hargreaves principles of postmodern professionalism.

- Opportunity and responsibility to exercise discretionary judgment
- Opportunity and expectations to engage with moral and social purposes
- Commitment to working collegially within collaborative cultures.
- Occupational heteronomy other than self protective autonomy.
- A commitment to active care and not just anodyne survive for students
- The creation and recognition of high task complexity

Teachers therefore need to learn to learn and also learn to teach.

We have walked together with Avril through the challenges and changes in the knowledge society; the role off digital tools in teachers' learning and practices, a conceptualization of teachers as creative practitioners and metaphors for model of teachers' education and professional knowledge in our times.

Bernard Cornu

He looks at training of teachers as a very crucial issue in education that ought to be addressed in favor of knowledge society. The profound change in the world that has deeply impacted the role of teachers and teaching profession is ICT. It has not only brought new tools for accessing resources for teaching and learning but it has given a challenge to teachers training.

Bernard defines information as facts or commends or opinions expressed through words, images, sound that can be sorted, circulated exchanges or bought. He considers knowledge as output of the process of reconstruction information by a person according to his or her context or situation and history. He commends that knowledge society presents a move away from the hierarchical society which is categorized by one to one and one to all communication to a networked society where there is evolutive interaction with communication from all to all. This means that teachers should be capable of guiding the learners to the paths of knowledge and also to ways of communicating their ideas to others.

Knowledge society to Bernard is also categorized by the development of collective intelligence inside the group through communication. It is about collective competence and capabilities, collective learning collaboration and memory.

Teacher training in Europe

Since the 1970s teacher education has been shifted to higher education or universities and the tendency has been towards increasing the duration of training; primary teachers take 3-5 years while secondary teachers take 3 to 6 years. The European countries embrace both the successive (professional competences are acquired after studying one's subjects) and parallel (professional competences are acquired through out the course) models of training.

To the European countries, teacher training should

- Articulate subject professional training
- Articulate theory and practice
- Enhance lifelong learning through pre-service and in-service trainings
- Be based on research

Key contention raised about teacher training is about

- The place of practical training in schools and its articulation with theoretical trainings
- Teachers trainers and their link with the schools
- Increases in academic knowledge and improvement in professional competence

The bologna process and Lisbon strategies help to give a new face to teacher education in the age of knowledge society

This convention came up with a strategic objective

To improve the quality and effectiveness of education and training systems in European unions. This included a sub objective of improving education and training for teachers and trainers. Under it, access to knowledge is of the highest importance. There was the interest of attracting and retaining qualified and motivated people in the teaching profession.

For Europe and any other nation like Uganda to achieve such ambitious goals, there is need for the state to:

- Identify the skills which are needed to be developed or teachers should have given their changing roles in the knowledge society.
- Provide conditions which can adequately support teachers as they respond to the challenges of knowledge society for example initial and in-service training in the perspectives of lifelong learning.
- Secure sufficient level of entry to the teaching profession for all the subjects and the levels to provide for long-term needs of the profession with attractive training programs.
- Attract recruit to teaching those who have professional experience in other fields.

Teachers play very crucial roles in supporting learning experience of the young and adult learners. They are key players in how education system evolves and in the implementation of reforms. To equip teachers to respond to the evolving challenges of the knowledge society, participate actively and prepare learners to be autonomous life long learners, four common principles were proposed:

- A well qualified profession: all teachers should be well qualified. They should attain highest levels of education possible and should be trained in multi disciplinary way. This is to ensure them have extensive knowledge, good pedagogical skills and proper understanding of social and cultural dimensions of education.
- A profession placed within the context of lifelong learning: teachers should be supported in order to continue their professional development through out their career. They should engage in innovations and research to keep pace with the evolving knowledge society.
- A mobile profession: mobility should be central component of initial and continuing teacher education programs. Mobility should be between different levels of education and towards different professions within education sectors.
- A profession based on partnership: institutions providing teacher education should organize their work collaboratively in partnership with schools, industrial and vocational settings, work-based training provider and other stakeholders.

Teacher competences should be on:

Working with others: their profession should be based on social inclusion and nurturing of the potentials of every learner. Teachers should be able to work with every learners and also work collaboratively with colleagues to develop collective intelligence of both learners and staff so as to enhance learning and teaching.

Working with knowledge, technology and information: teachers should be able to work with variety of knowledge. This calls for professional development to help them access, analyze, validate, reflect, use technology effectively.

Work with and in society: teachers should prepare learners for global citizenship/ responsibilities. This is by promoting cooperation and intercultural respect and understanding. They should create social cohesion amidst diverse learners and work effectively with the community.

“Technology matters but good teachers and good teacher matters even more.”

Conclusion

As educators and colleges with expertise and experience, this article appeals to us to be committed in mainstreaming the education system through thinking about the identities of teachers in the changing world so as to produce more creative, critical teachers prepared not only to deal with what is but to read the paths of the world and make envisioned strides with irresistible force against the unmovable to dislodge them from the path of knowledge society.

Teacher education in the perspective of Uganda

Curriculum of teacher education

The most fundamental question in teacher education in a knowledge society is on the kind of knowledge; attitude, behaviors and skills teachers should possess. This is because teachers are entrusted with the transmission to the learners, societal belief, attitudes and deontology as well as information, advice and wisdom and with facilitating learner's acquisition of key knowledge, attitudes and behaviors that they will need to be active participants in the society and the economy. This calls for Continuous professional development aware that the teachers are preparing young people to enter in a rapidly changing world and the fact that teaching skills required are evolving likewise, no initial course of teacher education can be sufficient to prepare a teacher for a career of 30 or 40 years. Continuous professional development or further education is therefore a process by which teachers reflect upon their competences maintain them up-to-date and development them further.