CLASROOM-BASED ASSESSMENT OF 21\textsuperscript{ST} CENTURY SKILLS: IN SECONDARY SCHOOLS IN KENYA

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This research project submitted in partial fulfillment of the requirements of the degree of Masters of Education in Measurement and Evaluation.

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DECLARATION

This project is my original work and has not been presented for a degree or in any other university.

.................................................................

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E58/66507/2011

This research project has been submitted for examination with my approval as University Supervisor.

.................................................................

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ABSTRACT

The research project was carried out to examine teacher practices regarding “assessment as integrated in the learning that follow 21st century thinking. This is process that transcends traditional behavioral approaches of learning that leads to transformational skills of learning. Assessment is a key component of teaching and learning process (Goodrum; Hackling and Rennie, 2001). It is through assessment that learning is communicated and articulated learners. This study addressed four objectives;

a. To determine knowledge and understanding of 21st Century concepts and practices by teachers.
b. To find out the types of tests used to assess learning in the 21st Century perspective towards transformative assessment.
c. To find out the nature of examinations applied in secondary schools and their appropriateness to the 21st Century learner performance.
d. To determine the extent to which testing desirable 21st century skills is feasible.

The study adopted descriptive survey design. Stratified random sampling and purposive sampling were used to select the sample from the target population. Data was analyzed using descriptive statistics. The main finding of the study was that teachers lack the skills and knowledge to adjust the traditional assessment skills to alternative assessment skills that would address the needs for the 21st century learning. The shift desired is from traditional measurement theory approaches to assessment that embraces critical thinking and awareness. Teachers are yet to adjust as well. The assessment teaching and assessment practices reflect those of traditional education theorists which is not appropriate in the current education thinking that embraces 21st Century thinking. This study brings to the surface and shows evidence of education practice that requires thinking through and re-addressing the pertinent issues that are necessary if learning is to be productive in the current dispensation. The study is therefore useful to policy makers as well as educators more so assessment practitioners. Recommendations are made to have the education system reviewed and current thinking integrated across all levels of what pertains to education psychology as a practice and a tool in reforming education. Education assessment that addresses 21st century skills and practice is key to this transformation.
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Appendix 2 Questionnaire for teachers

Appendix 3 Questionnaire for principals
LIST OF ACRONYMS

ETS - Educational Testing Service
CCSS - Common Core State Standards
P21 - Partnership for 21st Century Skills
ATC21 - Assessment and Teaching of 21st Century Skills
KSAVE - Knowledge, Skills, Attitudes, Values and Ethics.
NRC- National Research Council
NCEE- National Council on Economic Education
CHAPTER ONE
INTRODUCTION

1.1 Background Information
At the turn of the 21st century, the world was defined for us. This resulted in calling for education transformation beyond reform. The world has been faced with the need for skills beyond traditional disciplinary skills to meet demands of the changing world. Rapid changes arising from technological advancement, scientific innovation, increased globalization, shifting workforce demands and pressures of economic competitiveness are redefining the broad skill set that students need to be adequately prepared to participate in, and contribute to, in today’s market economy as well as society (Levy & Murnane, 2005). According to Packer & Goicoechea, (2000), whether learning can be called the process of human change and transformation or the acquisition of knowledge and expertise, it always entails participation in relationship to community transformation both of the person and of the social world. This is key to today’s’ systems of education if education is to be of value to an individual.

Education becomes the most powerful weapon, which can be used to transform the world (van der Rheede, 2009). Education becomes the single most important factor essential for economic growth, technological advancement, social-cultural sophistication, healthy living and successful political governance. To meet this challenge schools must be transformed in ways that will enable students to acquire the creative thinking, flexible problem solving, collaboration and innovative skills they will need to be successful in work and life (Voogt, 2005), these being the tenents of the 21st Century. The transformation should not be mere change as has been the tradition over time. Learning must therefore be transformed and not just changed for education to become relevant for survival in the complex world described. The requirement must be for competencies related to quick thinking, self directed learning, curriculum that comments one to the realities of the community. This is the argument for the 21st Century.

The result has been the desire and need for new ways of educating. This has resulted in a different kind of teacher and learner. This has had an effect on content taught, new approaches to pedagogic strategies, learner initiatives and motivation, assessment for learning or classifying learnedness to present academic and performance skills. The question that arises that should be
of interest to the education fraternity is whether the agenda for the 21st Century has been embraced and is being practiced and benefits are evidenced in the learner. The whole education system must respond right from policy, curriculum in place, pedagogic strategies, and assessment of learning and impact of educating process. There is need to teach towards attainment of 21st Century skills. There is also need to award and grade these skills which results in multi-discipline approach to learning. Learning as assessed and carried out currently is more to assign a score or a grade to characterize learning. This makes it difficult to define the behavior arising from one who has acquired 21st Century Skills. There is need to assess the learning and learner performance in a mode that represents and reflect 21st Century skills.

The challenge is the educators are moving towards transforming education while still struggling with challenges inherent from the last century. However, the need to ensure 21st Century skills is not negotiable. The question arising is if the education fraternity is ready for the transformation and if they are aware of what this change implies. More so, does the pedagogy strategies and learner behavior lead to a process of assessment that reflects the transformation desired. The essence of this study was on assessment of education regarding learning and learnedness towards 21st Century skills.

Graume and Naidoo (2004), indicates that, “in a global economy, assessment of students achievement is changing mainly because in an ever-changing knowledge based society, students would not only be required to learn and understand the basics but also to think critically, to analyze, and to make inference for making decisions.” In order to prepare students from an early age to meet global challenges, the authors recommend assessing skills such as ‘critical thinking, ‘creativity,’ ‘communication,’ and ‘collaboration’ in the context of interdisciplinary themes such as financial literacy and environmental literacy as well as in core subject areas of mathematics and language arts. By developing assessments as rich simulated environments, students are expected to show their performance in authentic and engaging situations. By exploring new ways of assessing 21st Century skills that links them to instruction aimed at deepening learning, we can prepare our students to be competitive in a global economy (Maryam Tager, 2012)
In which case, education assessment must be made from primarily measuring discrete knowledge to measuring students’ ability to think critically, examine problems, gather information, and make informed, reasoned decisions while using technology (The Partnership for 21st Century Skills, 2010). Assessment processes, then, should enable students to demonstrate deep understanding of concepts rather than surface knowledge and recall of facts. Assessment should be able to reveal the quality of students’ understanding and thinking as well as specific content or processes (Assessment and reporting unit, 2005).

1.2 Statement of the Problem

How we live, work, play and learn has been dramatically transformed by technology over the past 20 years. We need different skills today than we did in the 20th century, and educational institutions have a critical role to play in developing those skills. But by and large, Primary and Secondary Schools have not kept pace with the changing skill sets that students need to succeed. In fact, there’s nothing broad-based in place right now to determine whether our schools are doing well at teaching these skills.

In recent years, education has frequently been blamed because graduates from universities are not sufficiently able to apply their knowledge to solve complex problems in a working context. The development and implementation of pedagogic or instructional practices that will foster students’ skills to communicate, think and reason effectively, make judgments about the accuracy of masses of information, solve complex problems and work collaboratively in diverse teams, remains an important challenge for today’s education (Pellegrino, Chudowsky & Glaser, 2001).

Kenya’s education sector has achieved many milestones since independence. However due to challenges of high population and unsustainable utilization of resources, Kenya is faced with many challenges that require urgent reforms to be able to sustain the ever increasing demand for education; free and compulsory education; and education for industrialization in line with the vision 2030 and Constitution 2010. Currently, the main focus is on improving levels of access, retention, completion, equity, quality, relevance, transition and efficiency of the education sector. Following the launch of Kenya Vision 2030 in 2007 and the promulgation of the new
The constitution in August 2010 it has become necessary to re-align the education sector to comply with the new developments.

For Kenya to be internationally competitive and economically viable, the Republic of Kenya requires an education system that will produce citizens who are able to engage in lifelong learning, learn new skills quickly, perform more non-routine tasks, capable of more complex problem-solving, take more decisions, understand more about what they are working on, require less supervision, assume more responsibility, have more vital tools, have better reading culture, quantitative analysis, reasoning and expository skills.

Reflecting on our test culture, which has a long tradition in many European countries, several problems may be discerned. Because of their static and product-oriented nature and their distance from daily learning practice, traditional achievement tests fail to provide relevant diagnostic information about the learner that is needed to adapt instruction appropriately to the needs of the learner of the 21st Century. Tests are diagnostic aids only when they identify the extent to which the goals are attained. This means that, with the aforementioned changing goals, tests must be sensitive to how well students are able to use knowledge in an interrelated way when analyzing and solving authentic problems.

Research on 21st Century skills is only just beginning to take shape making this an important theme of research. The situation is worse in Africa where not much has been done to determine Africa’s focus on learning even as the world struggles with 21st century challenges. Therefore the study came up at an opportune time to help Africa and so Kenya keep pace with current education agenda in developing competences in the 21st first century.

1.3 Purpose of the Study

The purpose of this study was to determine extent to which education assessment is geared towards learning that addresses 21st Century skills.
1.4 Objectives of the Study
a) To determine knowledge and understanding of 21st Century concepts and practices by teachers
b) To find out the types of tests used to assess learning in the 21st Century perspective towards transformative assessment
c) To find out the nature of examinations applied in schools and their appropriateness to the 21st Century learner performance
d) To determine the extent to which testing desirable 21st century skills is feasible.

1.5 Significance of the study
The main purpose of the study was to determine whether teachers have the knowledge and understanding of the 21st Century concepts and practices. To determine the nature and types of classroom tests used to assess learning in the 21st Century.

1.6 Definition of significant terms
21st Century skills – the need for individuals to flexibly adapt to a changing society as well as the need for sustainable democratic development
Assessment- direct measure of what has been learnt as a result of instruction on specific objectives (Gagne, Briggs &Wager, 1998)
Education assessment -any procedure or activity that is designed to collect information about the knowledge, attitude, or skills of the learner or group of learners
Tests – is an assessment intended to measure a test-takers knowledge, skill, aptitude or classification in many other topics
Classroom Tests - is a method of assessing student performance by measuring academic and/or behavioral progress while the student participates in a typical school learning situation.
Learner - someone who is learning about a particular subject or how to do something.
Evaluation- Is concerned with judging the adequacy or worth of a particular performance or a sample of students’ knowledge, understanding, skills or feelings (Erickson,1978).
Measurement- is systematic process that is concerned with developing a quantitative and qualitative description of student performance or behavior (Erickson &Wentling, 1978)
21st Century learning- learning geared towards acquisition of core competencies such as collaboration, digital literacy, critical thinking and problem solving

21st Century testing- assessment that provides deeper insight into students grasp of critical 21st century skills

Critical thinking- the use of those cognitive skills or strategies that increase the probability of a desirable outcome” (Halpern, 1998)
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
Despite the many frameworks that try to define the skills needed for 21st century critical thinking, creativity, collaboration, meta-cognition and motivation emerge to be the most important skills for 21st century. This chapter synthesizes literature review pertaining to the core 21st century skills: critical thinking, creativity, collaboration, meta-cognition, and motivation. It also highlights the driving forces of the 21st century skills, Education research learning and learning tools in the 21st century, and the 21st century frameworks that arise.

2.2 The Concept of 21st Century Skills
Numerous skills frameworks exist and different frameworks identify different skills as important. The Educational Testing Service (ETS) in its publication, Digital Transformation: A Literacy Framework for ICT Literacy (2007), defines 21st century learning skills as the ability to a) collect and/or retrieve information, b) organize and manage information, c) evaluate the quality, relevance, and usefulness of information, and d) generate accurate information through the use of existing resources.

The Common Core State Standards (CCSS) in English Language Arts specifically call for instructional emphasis on “application of knowledge through higher-order skills,” such as the ability to create and support arguments based on evidence and logical reasoning through writing and sharing ideas with classmates via speaking and listening during informal collaboration. Similarly, the CCSS in Mathematics highlight student ability to “practice applying mathematical ways of thinking to real world issues and challenges.”

The Partnership for 21st Century Skills (P21) has created a comprehensive framework for conceptualizing different types of skills important for college and the workforce. For example, learning and innovation skills include creativity and innovation, critical thinking and problem solving, and communication and collaboration. Information, media, and technology skills include information literacy, media literacy, and information/communications/technology literacy.
Finally, life and career skills include flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility (Partnership for 21st Century Skills, 2009). The National Research Council initiated an investigation into the topic of teaching and assessing 21st century skills: (1) cognitive skills, including critical thinking, non-routine problem solving, and systems thinking; (2) interpersonal skills, including complex communication, social skills, teamwork, cultural sensitivity, and dealing with diversity; and (3) intrapersonal skills, including self-management, time management, self-development, self-regulation, adaptability, and executive functioning (Committee on the Assessment of 21st Century Skills, 2011). Finally, the Assessment and Teaching of 21st Century Skills (ATC 21) organization has also offered a framework for organizing different types of 21st century skills (Binkley et al., 2010).

This framework includes four classes of skills:
1. Ways of Thinking, which encompasses creativity and innovation; critical thinking, problem solving, and decision-making; and metacognition or learning to learn
2. Ways of Working, which includes communication and collaboration or teamwork
3. Tools for Working, which addresses information literacy and information and communication technology (ICT) literacy
4. Living in the World, which includes citizenship, life and career skills, and personal and social responsibility

The ATC 21 framework identifies several important dimensions that cut across these different types of skills, referred to as the KSAVE model, where the acronym represents Knowledge, Skills, and Attitudes/Values/Ethics. This model suggests that there are knowledge components, skill components, and affective, dispositional, or attitudinal components within each of the four core skills type. Among the various frameworks there are clear areas of overlap.
Table 2.1: Table describing the various areas of overlap among the Frameworks for 21st Century Skills

<table>
<thead>
<tr>
<th>Research-based construct</th>
<th>P21 Framework terminology</th>
<th>NRC Framework terminology</th>
<th>ATC 21 Framework terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical thinking</td>
<td>Learning and innovation – critical thinking</td>
<td>Cognitive – critical thinking</td>
<td>Ways of thinking – critical thinking, problem-solving, and decision-making</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Learning and innovation – communication and collaboration</td>
<td>Interpersonal – complex communication, social skills, teamwork</td>
<td>Ways of working – communication and collaboration</td>
</tr>
<tr>
<td>Creativity</td>
<td>Learning and innovation – creativity and innovation</td>
<td>Cognitive – non-routine problem solving</td>
<td>Ways of thinking – creativity and innovation</td>
</tr>
<tr>
<td>Motivation</td>
<td>Life and career skills – initiative, flexibility</td>
<td>Intrapersonal – self-development, adaptability</td>
<td>Living in the world – adaptability, flexibility, self-direction</td>
</tr>
<tr>
<td>Metacognition</td>
<td>Life and career skills – self-direction, productivity</td>
<td>Intrapersonal – self-management, self-regulation</td>
<td>Ways of thinking – metacognition or learning to learn</td>
</tr>
</tbody>
</table>

The table describes the areas of overlap among various frameworks that define the 21st century skills. Among them P21 framework, NRC framework and the ATC 21 framework. The various frameworks use different terminologies to describe the necessary 21st century skills. From the various areas of overlap of the 21st century skills: critical thinking, creativity, collaboration, metacognition and motivation emerge to be the most important skills for 21st century. The following research basis its literature on the major 21st century skills which most of the researchers seem to agree. These include critical thinking, creativity, collaboration, metacognition and motivation.
2.2.1 The Concept of Critical Thinking

Educators have long been aware of the importance of critical thinking skills as an outcome of student learning. Despite widespread recognition of its importance, there is a notable lack of consensus regarding the definition of critical thinking. Sternberg (1986) identified several schools of thought on the issue, with one school represented by cognitive psychologists and the other represented by philosophers of education. These two approaches differ primarily in terms of two dimensions: (1) whether researchers focus on the ideal critical thinker versus how people actually think and (2) whether they focus on qualities of thought versus actions or behaviors exhibited by critical thinkers (with the former characterizing the philosophical approach and the latter representing the cognitive psychological approach).

One classic definition of critical thinking developed in the philosophical tradition depicts it as “reflective and reasonable thinking that is focused on deciding what to believe or do” (Ennis, 1985, p. 45). A corresponding popular definition offered by cognitive psychologists is that critical thinking is “the use of those cognitive skills or strategies that increase the probability of a desirable outcome” (Halpern, 1998, p. 450). More recently, critical thinking has been compared to rational thinking, defined as “adopting appropriate goals, taking the appropriate action given one’s goals and beliefs, and holdings beliefs about the world that are commensurate with available evidence “ (West, Toplak, & stanovich, 2008)

Despite differences among the schools of thought and their approaches to defining critical thinking, there exist areas for agreement. First, researchers of critical thinking typically agree on the specific subskills encompassed by the definition, which include: analyzing arguments, claims, or evidence (Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992); making inferences using inductive or deductive reasoning (Ennis, 1985; Facione, 1990; Paul, 1992; Willingham, 2007); judging or evaluating (Ennis, 1985; Facione, 1990; Lipman, 1988; Tindal & Nolet, 1995); and making decisions or solving problems (Ennis, 1985; Halpern, 1998; Willingham, 2007)

Other abilities or behaviors identified as relevant to critical thinking include asking and answering questions for clarification (Ennis, 1985); defining terms (Ennis, 1985); identifying assumptions (Ennis, 1985; Paul, 1992); interpreting and explaining (Facione, 1990); reasoning
verbally, especially in relation to concepts of likelihood and uncertainty (Halpern, 1998); predicting (Tindal & Nolet, 1995); and seeing both sides of an issue (Willingham, 2007). Most researchers also agree that in addition to skills or abilities, critical thinking entails dispositions (Facione, 1990; Toplak & Stanovich, 2002).

As early as 1985, researchers working in the area of critical thinking recognized that the ability to think critically is distinct from the disposition to do so (Ennis, 1985). Empirical evidence appears to confirm the notion that critical thinking abilities and dispositions are, in fact, separate entities (Facione, 2000; Toplak & Stanovich, 2002). These dispositions have variously been cast as attitudes or habits of mind. Facione (2000) defines critical thinking dispositions as “consistent internal motivations to act toward or respond to persons, events, or circumstances in habitual, yet potentially malleable ways” (p. 64). Researchers tend to identify similar sets of dispositions as relevant to critical thinking. For example, the most commonly cited critical thinking dispositions include: open- or fair-mindedness (Bailin et al., 1999; Ennis, 1985; Facione 1990, 2000; Halpern, 1998); the propensity to seek reason (Bailin et al., 1999; Ennis, 1985; Paul, 1992); inquisitiveness (Bailin et al., 1999; Facione, 1990, 2000); the desire to be well-informed (Ennis, 1985; Facione, 1990); flexibility (Facione, 1990; Halpern, 1998); and respect for, and willingness to entertain, others’ viewpoints (Bailin et al., 1999; Facione, 1990).

Finally, most researchers working in the area of critical thinking agree on the important role of background knowledge. In particular, most researchers see background knowledge as essential if students are to demonstrate their critical thinking skills (Case, 2005; Kennedy et al., 1991; Willingham, 2007). As McPeck (1990) has noted, to think critically, students need something to think critically about. Similarly, Bailin et al. (1999) argue that domain-specific knowledge is indispensable to critical thinking because the kinds of explanations, evaluations and evidence that are most highly valued vary from one domain to another.

Some researchers go even further to argue that critical thinking is entirely domain-specific. In other words, there is no such thing as generalized critical thinking skills. For example, Kuncel (2011) argues that generalized measures of critical thinking are indistinguishable from general intelligence or ability, and that such measures do not contribute usefully above general
intelligence to the prediction of important educational outcomes. However, Toplak and Stanovich (2002) demonstrate that critical thinking dispositions, such as need for cognition and reflectivity, are better predictors of performance on domain-neutral disjunctive reasoning tasks than general cognitive ability. Similarly, West, Toplak and Stanovich (2008) demonstrate that a generalized measure of critical thinking—performance on syllogistic reasoning tasks—is a better predictor of the ability to avoid cognitive biases than is general cognitive ability. Other researchers argue that critical thinking encompasses both general and domain-specific aspects (Ennis, 1985; Paul, 1992; Smith, 2002). In other words, some critical thinking skills apply to multiple domains (e.g., formal rules of logic), whereas others are unique to specific subject areas (e.g., the use of proofs in mathematics or the scientific method in science).

2.2.2 The Concept of Creativity.
Psychologists such as Vygotsky and Guilford have long maintained the importance of fostering creative development in children in order to prepare them for a changing future (Beghetto, 2010; Guilford, 1950). However, many educators still consider nurturing creativity within the purview of gifted and talented teachers, and separate from mainstream classroom curricula. This perception is beginning to change among researchers and educational, policy makers who recognize the link between creativity and economic and cultural prosperity (Beghetto, 2010; P21, 2009).

As with critical thinking, there is no single accepted definition of creativity. However, the definition of creativity as “the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context” encompasses much of the current thinking in the field (Plucker, Beghetto, & Dow, 2004, p. 90, emphasis in original). Underlying almost all definitions of creativity is the notion that a creative product is both novel and has some sort of value. A novel product that does not take into account task parameters (i.e., is not useful) may be considered bizarre rather than truly creative (Lubart & Geogsdottir, 2004; Lubart and Guignard, 2004). Most researchers also recognize that creative achievement requires a combination of cognitive skills, dispositions, and environmental factors (Sternberg, 2006a; Torrance, 1977; Treffinger, et al., 2002; Van Tassel-Baska & MacFarlane, 2009). Commonly recognized creativity-related cognitive skills include the
ability to: Identify problems (Sternberg, 2010; Torrance, 1977); Generate ideas, often by thinking divergently using fluency, flexibility, originality, and elaboration (Treffinger et al., 2002; Van Tassel-Baska & MacFarlane, 2009); and Solve problems (Torrance, 1977).

Just as important to the creative process are analytic and evaluative skills. These critical thinking skills are essential in judging whether a creative output is worth pursuing (i.e., has value) (Sternberg, 2006a). Possessing the requisite cognitive skills does not mean a person will undertake creative endeavors (Guilford, 1950, Sternberg, 2006a). In fact, Sternberg (2006a) asserts that being creative involves a deliberate choice. Sternberg equates creativity with a habit, stating “[creative people] habitually respond to problems in fresh and novel ways, rather than allowing themselves to respond mindlessly and automatically” (Sternberg, 2010. p. 394). Creative people tend to be motivated, often intrinsically (Russ, 1996; Sternberg, 2010; Van Tassel-Baska & Macfarlane, 2009) willing to take intellectual risks, such as sharing tentative ideas, asking questions, and attempting to do and learn new things that place themselves at risk of making mistakes or appearing less competent than others (Beghetto, 2009; Russ, 1996; Sternberg, 2010; Treffinger et al., 2002); open to new ideas (Russ, 1996; Sternberg, 2010; Treffinger et al., 2002; Van Tassel-Baska & Macfarlane, 2009); and tolerant of ambiguity (Russ, 1996; Sternberg, 2010; Van Tassel-Baska & Macfarlane, 2009). Creative people also tend to have high creative self-efficacy or belief in their ability to generate new and meaningful ideas (Beghetto, 2010; Russ, 1996; Sternberg, 2010). Of these dispositions, motivation, intellectual risk taking, and creative self-efficacy can be especially important in the face of the natural resistance society often displays toward creative ideas that are new and untested (Sternberg, 2006a).

Creativity researchers note that environmental and cultural factors play a role in both determining an individual’s creative potential, as well as interpreting creative outputs. Environmental factors that support creativity include external support or acceptance of novel ideas, products, or ways of doing things (Runco, 2004; Sternberg, 2006a) or forums in which people are exposed to or can express creative products (Lubart & Guignard, 2004; Sternberg, 2006a).
In addition, the culture to which a person belongs can influence the settings and formats in which it is acceptable to be creative. For example, creativity tends to be more product-oriented in western cultures and process-oriented in eastern cultures (Lubart and Georgsdottir, 2004). One issue of debate within the field of creativity is that of domain specificity. Many scholars identify domain-specific knowledge and skills as key components of creativity ((Treffinger et al, 2002; VanTassel-Baska& MacFarlane, 2009). For example, in a study of 109 second graders, Han and Marvin (2002) found that domain-general divergent thinking skills did not predict creative performance in language, math, and art. It should be mentioned, however, that divergent thinking skills are not equivalent to creativity, but are rather a subset of creativity-related cognitive skills. It is likely that creativity entails both domain-specific and domain-general components (Lubart&Guignard, 2004; Treffinger et al, 2002). Creative outputs (products, performances, and ideas) often display domain specificity dependent on the knowledge and skill sets unique to the field in which a particular creative output is generated. However, some of the creativity-related skills and dispositions used to reach that output may be generalizable, such as the ability to combine seemingly disparate ideas in unique ways (Lubart&Guignard, 2004). Although a certain level of domain-specific knowledge is essential for creativity, too much knowledge may actually hinder creativity. A person may have difficulty manipulating the concepts within a particular field in novel ways if he or she is too ingrained in traditional thinking (Sternberg, 2010).

Finally, two related issues of debate among scholars are what constitutes a creative output and who can be creative. Although there is a general consensus that creative products are both novel and serve a purpose, there is disagreement as to what level of novelty is required to make something creative. Some scholars argue that in order for something to be creative, it must have an impact on society as a whole. In this eminent view of creativity, very few ideas or products are truly creative. This view implies that only a small number of highly talented individuals are actually creative (Van Tassel-Baska& MacFarlane, 2009).

Runco (2003), Treffinger (2002), and Lubart (2004) are among the scholars who recognize a much broader range of creative products: a creative idea or output may be novel only for the individual who produces it, it may be novel for a particular peer group or field, or novel for society as a whole. What varies is the overall level of impact of the idea or creative output (e.g.
individual level or societal level) (Lubart&Guignard, 2004; Runco, 2003; Treffinger et al., 2002). In this view, everyone has the potential to be creative. This personal level of creativity in which something is novel only for an individual is sometimes referred to as “everyday creativity” (Runco, 2003) or “subjective creativity” (Kaufman, 2003).

2.2.3 The Concept of Collaboration.

Educators in a variety of educational settings—from K12 to the university classroom—have long used collaborative approaches to teaching and assessing students. More recently, educators and policy makers have identified the ability to collaborate as an important outcome in its own right rather than merely a means to teach and assess traditional academic content. Roschelle and Teasley (1995) define collaboration as a “coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem” (p. 70). They define the joint problem space as the shared knowledge structure that supports problem-solving by integrating goals, descriptions of the current problem state, and awareness of potential strategies, as well as the links between these things. According to Roschelle and Teasley, collaboration takes place within this joint problem space, which provides the structure needed to allow meaningful conversations about the problem. To construct a joint problem space, partners must have ways to introduce and accept knowledge, monitor exchange for evidence of divergent meanings, and repair any divergences identified.

Blatchford et al. (2003) discuss student collaboration in the context of group work, which they define as “pupils working together as a group or team. The teacher may be involved at various stages but the particular feature of group work—perhaps its defining characteristic—is that the balance of ownership and control of the work shifts toward the pupils themselves. Group work should involve children as co-learners…not just one pupil helping another” (p. 155). Collaborative learning is broadly defined as “a situation in which two or more people learn or attempt to learn something together,” and more specifically as joint problem solving (Dillenbourg, 1999, p. 1). As Dekker et al. (2006) note, “in collaborative learning, therefore, the focus of the analysis is on the students’ effort to show and explain ideas and action to each other with the aim to find common ground for building shared understanding and strategies” (p. 66). Similarly, Gillies (2003) explains, “When children work cooperatively together, they learn to
give and receive help, share ideas and listen to other students’ perspectives, seek new ways of clarifying differences and resolving problems, and construct new understandings and learning from engaging in these processes” (p. 137). As Van Boxtel, et al. (2000) explain, collaborative learning activities allow students to provide explanations of their understanding, which can help students elaborate and reorganize their knowledge. Social interaction stimulates elaboration of conceptual knowledge as group mates attempt to make themselves understood, and research demonstrates that providing elaborated explanations improves student comprehension of concepts. Once conceptual understandings are made visible through verbal exchange, students can negotiate meaning to arrive at convergence, or shared understanding.

Collaboration is sometimes distinguished from cooperative learning in that cooperation is typically accomplished through the division of labor, with each person responsible for some portion of the problem solving. Collaboration, on the other hand, involves participants working together on the same task, rather than in parallel on separate portions of the task. However, Dillenbourg et al. (1996) note that some spontaneous division of labor may occur during collaboration. Thus, the distinction between the two is not necessarily clear-cut. According to Dillenbourg et al. (1996), in cooperation, the task is split hierarchically into independent sub-tasks and coordination is only required for “assembling partial results.” Collaboration, on the other hand, may divide cognitive processes into intertwined layers, but coordination occurs throughout.

As Dillenbourg (1999) notes, there are several qualities that characterize truly collaborative interactions. For example, one marker of true collaboration is the quality of interactions, especially the degree of interactivity and negotiability (Dillenbourg, 1999). Interactivity refers to the extent to which interactions influence participants’ thinking. Negotiability refers to the extent to which no single group member can impose his view unilaterally on all others, but rather all group members must work toward common understanding. Collaboration sub-skills include coordination, communication, conflict resolution, decision making, problem solving, and negotiation (Blatchford et al., 2003; Fall et al., 1997; Webb, 1995; Webb & Mastergeorge, 2003). Particularly desirable forms of communication during collaborative learning include providing elaborated explanations to teammates, asking direct and specific questions, and responding
appropriately to requests from others (Gillies, 2003; Kouros&Abrami, 2006; Webb, 1995; Webb et al., 2001).

2.2.4 The Concept of Metacognition.

John Flavell originally coined the term metacognition in the late 1970s to mean “cognition about cognitive phenomena,” or more simply “thinking about thinking” (Flavell, 1979, p. 906). Subsequent development and use of the term have remained relatively faithful to this original meaning. For example, researchers working in the field of cognitive psychology have offered the following definitions: “The knowledge and control children have over their own thinking and learning activities” (Cross & Paris, 1988, p. 131). “Awareness and management of one’s own thought” (Kuhn & Dean, 2004, p. 270). “The monitoring and control of thought” (Martinez, 2006, p. 696).

In cognitive psychology, metacognition is often defined as a form of executive control involving monitoring and self-regulation (Kuhn & Dean, 2004; McLeod, 1997; Schneider &Lockl, 2002). Schraw (1998) describes metacognition as a multidimensional set of general, rather than domain-specific, skills. These skills are empirically distinct from general intelligence, and may even help to compensate for deficits in general intelligence and/or prior knowledge on a subject during problem solving.

Metacognition has two constituent parts: knowledge about cognition and monitoring of cognition (Cross & Paris, 1988; Flavell, 1979; Paris &Winograd, 1990; Schraw&Moshman, 1995; Schraw et al., 2006; Whitebread et al., 1990). Several frameworks have been developed for categorizing types of cognitive knowledge and regulation. Table 2 organizes components from each of these frameworks to facilitate comparisons among them. For example, Flavell (1979) defines cognitive knowledge as knowledge about one’s own cognitive strengths and limitations, including the factors (both internal and external) that may interact to affect cognition. He classifies such knowledge into three types: (1) “person” knowledge, which includes anything one believes about the nature of human beings as cognitive processors; (2) “task” knowledge, which includes knowledge about the demands of different tasks; and (3) “strategy” knowledge, which is knowledge about the types of strategies likely to be most useful.
<table>
<thead>
<tr>
<th>Metacognitive Component</th>
<th>Type</th>
<th>Terminology</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive knowledge</td>
<td>Knowledge about oneself as a learner and factors affecting cognition</td>
<td>Person and task knowledge</td>
<td>Flavell, 1979</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-appraisal</td>
<td>Paris &amp; Winograd, 1990</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Epistemological understanding</td>
<td>Kuhn &amp; Dean, 2004</td>
</tr>
<tr>
<td></td>
<td>Strategy knowledge</td>
<td>Flavell, 1979</td>
<td></td>
</tr>
<tr>
<td>Cognitive regulation</td>
<td>Knowledge about why and when to use a given strategy</td>
<td>Conditional knowledge</td>
<td>Schraw et al., 2006</td>
</tr>
<tr>
<td></td>
<td>Attending to and being aware of comprehension and task performance</td>
<td>Monitoring or regulating</td>
<td>Cross &amp; Paris, 1988 Paris &amp; Winograd, 1990 Schraw et al., 2006 Schraw &amp; Moshman, 1995 Whitebread et al., 2009</td>
</tr>
<tr>
<td></td>
<td>Cognitive experiences</td>
<td>Flavell, 1979</td>
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</tr>
</tbody>
</table>
The table attempt to describe the various components of metacognition. It briefly describes the type of metacognition and the terminologies mostly used to describe the components based on different researchers in the area. It describes cognitive knowledge and cognitive regulation as the basic components of metacognition.

Subsequent metacognition researchers have offered a slightly different framework for categorizing cognitive knowledge. For example, several researchers have used the concepts of declarative and procedural knowledge to distinguish cognitive knowledge types (Cross & Paris, 1988; Kuhn, 200z0; Schraw et al., 2006; Schraw&Moshman, 1995). Kuhn and Dean (2004) characterize declarative cognitive knowledge broadly as epistemological understanding, or the students’ understanding of thinking and knowing in general. Schraw et al. (2006) portray declarative cognitive knowledge as knowledge about oneself as a learner and what factors might influence one’s performance. Paris and Winograd (1990) discuss the process of self-appraisal as reflection about personal knowledge states to answer the question, “Do I know this?” Finally, Cross and Paris (1988) define declarative cognitive knowledge specifically within the context of reading as awareness of the factors that might affect reading ability. On the other hand, procedural knowledge involves awareness and management of cognition, including knowledge about strategies (Cross & Paris, 1988; Kuhn & Dean, 2004; Schraw et al., 2006). Schraw et al. (2006) also distinguish conditional cognitive knowledge, which is knowledge of why and when to use a given strategy.

The other component of metacognition is monitoring of one’s cognition, which many researchers have argued includes activities of planning, monitoring or regulating, and evaluating (Cross & Paris, 1988; Paris &Winograd, 1990; Schraw&Moshman, 1995; Schraw et al., 2006; Whitebread et al., 2009). Planning involves identification and selection of appropriate strategies and allocation of resources, and can include goal setting, activating background knowledge, and budgeting time. Monitoring or regulating involves attending to and being aware of comprehension and task performance and can include self-testing. Finally, evaluation is defined as “appraising the products and regulatory processes of one’s learning,” and includes revisiting and revising one’s goals.(Schraw et al.,2006, p. 144)
Researchers have observed a relationship between cognitive knowledge and cognitive monitoring. For example, Flavell (1979) argues that metacognitive experiences that allow one to monitor and regulate one’s cognition play a major role in the development and refinement of metacognitive knowledge. In turn, Schraw (1998) cites a number of empirical studies demonstrating that cognitive knowledge appears to facilitate cognitive regulation. He notes that such studies have found cognitive knowledge and cognitive regulation to be correlated with one another at about r = 50.

2.2.5 The Concept of Motivation
The topic of motivation enjoys a substantial research base. Motivation is defined as all the reasons that underlie willing and volitional behavior (Guay et al., 2010). Researchers often distinguish intrinsic from extrinsic motivation. Intrinsic motivation is motivation that is animated by personal enjoyment, interest, or pleasure. As Deci et al. (1999) observe, “intrinsic motivation energizes and sustains activities through the spontaneous satisfactions inherent in effective volitional action. It is manifest in behaviors such as play, exploration, and challenge seeking that people often do for external rewards” (p. 658).

On the other hand, when people are extrinsically motivated, they pursue activities because of a desire to earn or avoid external rewards or sanctions (Ryan & Deci 2000). Educators have traditionally considered intrinsic motivation to be more desirable and to result in better learning outcomes than extrinsic motivation. Some research has demonstrated that intrinsic motivation leads to greater persistence at challenging tasks and better learning over time than extrinsic motivation (Ryan et al., 1990).

Motivation involves a constellation of one’s beliefs, perceptions, values, interests, and actions that are all closely related. As a result, various approaches to motivation can focus on cognitive behaviors (such as monitoring and strategy use), non-cognitive aspects (such as perceptions, beliefs, and attitudes), or both. For example, Gottfried (1990) defines academic motivation as “enjoyment of school learning characterized by a mastery orientation; curiosity; persistence; task-endogeny; and the learning of challenging, difficult, and novel tasks” (p. 525). On the other hand, Turner (1995) considers motivation to be synonymous with cognitive engagement, which
he defines as “voluntary uses of high-level self-regulated learning strategies, such as paying attention, connection, planning and monitoring”

2.2.5.1 Perceptions.
Self-efficacy is one’s perceived competence in a given area, as well as the perception that one is in control of his or her own performance (Bandura, 1993; Eccles&Wigfield, 2002). According to Bandura’s (1982) self-efficacy theory, efficacy is the major determinant of effort, persistence, and goal setting. Empirical research supports this notion, suggesting that individuals with higher self-efficacy tend to be more motivated and successful on a given task (Pintrich&DeGroot, 1990). Self-efficacy has also been associated with the use of cognitive strategies, and self-efficacy perceptions predict achievement over and above actual ability levels (Pintrich&DeGroot, 1990).

Another line of inquiry in the field of motivation explores the issue of locus of control. According to this theory, individuals should be more motivated to the extent that they feel they are in control of their own successes and failures (Eccles&Wigfield, 2002). A person’s perceptions of control over his or her own successes and failures are known as attributions (Weiner, 2000). Certain types of attributions are more likely to stimulate motivation than others. For example, empirical research suggests that those holding effort attributions tend to exhibit more positive learning behaviors, such as goal-setting that focuses on learning rather than performance (Miller &Meece, 1997), use of strategies, and persistence at difficult or challenging tasks (Stipek, 1996). When a person fails at a task, it is more motivating to attribute that failure to lack of effort than to lack of ability because the former attribution implies that with sufficient effort, the person is capable of performing the task in the future (Weiner, 2000). On the other hand, when a person succeeds at a task, it is more motivating to attribute that success to strong ability than to strong effort, because it enhances self-efficacy (Schunk, 1983).

2.2.5.2 Values
Values are incentives for engaging in certain activities. People hold different kinds of values, and these different kinds of values sustain student motivation more or less effectively (Eccles&Wigfield, 2002; Stipek, 1996). For example, when students intrinsically value a skill,
they personally enjoy performing that skill regardless of whether or not they are successful at it. Students holding such values are more likely to persist at challenging tasks than students who simply value successful performance (i.e., students who hold attainment values) or who only reflect on the negative aspects of performing the skill, such as anxiety and fear of failure (i.e., students who hold cost values) (Eccles & Wigfield, 2002).

2.2.5.3 Interests
Interests are also related to motivation in the sense that a person’s interests affect his or her goals and level of attention (Hidi & Harackiewicz, 2000). Interests have both cognitive and affective components. The cognitive component refers to knowledge acquisition or cognitive processing that occurs when students are engaged in a topic, whereas the affective component refers to the positive associations people tend to feel for topics they are interested in (Hidi & Renninger, 2006). Researchers distinguish between two types of interest: individual and situational. Individual interest is a relatively stable trait developed over time with respect to a particular topic or subject. Situational interest, on the other hand, is more immediate and temporary and reflects certain external factors, such as characteristics of a given task. A student with individual interest in a subject will persist at the task longer than a student with merely situational interest. However, it may be possible to “hook” students by triggering situational interest in some aspect of the task (e.g., offering a degree of student choice or presenting the task as a collaborative group activity). This situational interest can sometimes blossom over time into a more lasting individual interest (Hidi & Harackiewicz, 2000).

2.2.5.4 Goals
A person’s goals are related to his or her reasons for engaging with a task (Broussard & Garrison, 2004). Mastery goals focus on learning for the sake of learning, whereas performance goals are concerned with excelling in relation to others (Ames, 1992; Pintrich, 2003). Students holding mastery goals are more likely than those holding performance goals to have high self-efficacy, to believe success and failure are within their control, to persist at challenging tasks, and to use cognitive strategies associated with self-regulated learning. Such strategies include setting achievable goals, monitoring one’s performance, evaluating progress, and framing success and failure with respect to effort and ability (Ames, 1992; Broussard & Garrison, 2004).
As Eccles&Wigfield (2002) observe, mastery goals are associated with the strongest empirical evidence to date and have been linked to self-competence, self-concept, effort attributions, increased persistence at difficult tasks, and use of cognitive strategies related to monitoring, problem-solving, deep processing of information, and self-regulation.

In addition to the distinction between performance and mastery goals, there may also be a distinction between different types of performance goals. Performance approach goals are those that lead a student to tackle challenging academic tasks out of a desire to excel in relation to others, whereas performance avoid goals are those that cause a student to avoid challenging tasks so as not to risk appearing incompetent (Elliot & Church, 1997). Research focused on these different types of performance goals suggests that performance approach goals may not be as maladaptive in terms of student performance as once believed.

A wealth of empirical evidence on motivation exists, including research substantiating basic characteristics of the trait, such as domain specificity. Domain specificity is most likely due to individual differences in interests and self-concept across domains. In general, research suggests that the domain specificity of motivation and self-concept tends to increase with age, particularly as students accrue more educational experiences and as the curriculum begins to reflect departmentalization of academic subjects (Gottfried, et al., 2001).

2.3 Driving Forces of the 21st Century Skills

The prominent need for 21st century skills is a common issue across different frameworks developed by various researchers. This need for 21st century skills is mostly attributed to the changes in society, and more particularly, to the rapid development of technology and its impact on the way we live, work and learn. Through Information and Communication Technology our society is changing from an industrial society to information or knowledge society (Voogt, 2008). While in the industrial society the main focus of education was to contribute to the development of factual and procedural knowledge, in the information or knowledge society the development of conceptual and meta-cognitive knowledge is increasingly considered important (Anderson 2008).
Some frameworks also stress the changes in economy and the labor market caused by globalization and internationalization as one of the important driving forces for the need of 21st century skills (European Union). The need for individuals to flexibly adapt to a changing society (Assessment and Teaching of 21st Century Skills, Partnership for 21st century skills and European Union) as well as the need for sustainable democratic development (European union) are mentioned by a few frameworks.

In the latest developments on educational research learning and learning tools are regarded as an argument for 21st century skills. (Partnership for 21st century skills and En Gauge, 2011)

Overall, economic and societal changes closely related to the recent developments in technology and consequently in the characteristics of the jobs and the home environment seem to be regarded as the most important driving forces that call for 21st century skills.

Rapid changes in the world including technological advancement, scientific innovation, increased globalization, shifting workforce demands, and pressures of economic competitiveness are redefining the broad skill sets that students need to be adequately prepared to participate in and contribute to today’s society (Levy and Murnane 2005; Stewart 2010; Wilmarth 2010).

The following literature review analysis the various factors attributed to the need for the 21st century skills.

2.3.1 Economic Competitiveness and 21st Century Skills

Thanks in part to technological and communications advances, ordinary people are wearing more economic hats than ever before. In their roles as consumers, producers, workers, and investors, productive citizens need a level of economic literacy that will help them better comprehend the world and make good decisions for the future. Furthermore, because economic issues play an important role in local, state, national, and international policymaking, they frequently influence voter choices. A better understanding of economic issues, including the role businesses play in society, can enable citizens to recognize the forces that affect them every day, helping them identify and evaluate the consequences of private decision making and public policies. It is only when citizens are articulate and well informed that the institutions of a democratic market economy will function effectively (National Council on Economic Education [NCEE, 2003).
Nations are deeply concerned about their present and future prospects in a time of economic uncertainty. Policymakers have a make or break opening and an obligation to chart a new path for public education that will secure their economic competitiveness. Nations can thrive in this century only with informed leadership and concerted action that prepares citizens to compete. In an economy driven by innovation and knowledge, marketplaces engaged in intense competition and constant renewal, a world of tremendous opportunities and risks, a society facing complex business, political, scientific, technological, health and environmental challenges and in diverse workplaces and communities that hinge on collaborative relationships and social networking, the ingenuity, agility and skills of the people are crucial to the nation’s competitiveness. The ability to compete as a nation, regions and communities to attract growth industries and create jobs demands a fresh approach to public education.

There is need to recognize that a 21st century education is the bedrock of competitiveness the engine, not simply an input, of the economy. There is need to act accordingly: Every aspect of our education System; primary, postsecondary and adult education, after-school and youth development, workforce development and training, and teacher preparation programs must be aligned to prepare citizens with the 21st century skills they need to compete. (Partnership for 21st Century Skills, 2008). By the time students graduate, they should have developed a high degree of economic literacy. According to NCEE and its corporate sponsors, students should understand basic concepts and be able to reason logically about key economic issues that affect their lives as workers, consumers, and citizens. They should know some pertinent facts about the economy including its size and the current rates of unemployment, inflation, and interest and they should have an understanding of what those facts mean. Last, students should understand that economists often hold differing views on economic issues. This last understanding is especially important for topics such as the appropriate size of government in a market economy, how and when a government should deal with unemployment and inflation, and how and when it should promote economic growth. (NCEE, 2003).

2.3.2 Shifting Work Demands and 21st Century Skills

In the manufacturing and agrarian economies that existed 50 years ago, it was enough to master the reading, writing, and arithmetic. In the modern “flat world,” reading, writing and arithmetic’s
simply aren’t enough. If today’s students want to compete in this global society, however, they must also be proficient communicators, creators, critical thinkers, and collaborators. (Duncan Arne, 2011)

Life today is exponentially more complicated and complex than it was 50 years ago. This is true for civic life as much as it is for work life. In the 21st century, citizenship requires levels of information and technological literacy that go far beyond the basic knowledge that was sufficient in the past. With a host of challenges facing our communities, along with instant connectivity to a global society, civic literacy couldn’t be more relevant or applicable to the curricula in our schools. Global warming, immigration reform, pandemic diseases, and financial meltdowns are just a few of the issues today’s students will be called upon to address. Today’s students must be prepared to solve these challenges. (National Education association, 2011)

In addition, workforce skills and demands have changed dramatically in the last 20 years. The rapid decline in “routine” work has been well documented by many researchers and organizations. At the same time, there has been a rapid increase in jobs involving non-routine, analytic, and interactive communication skills. Today’s job market requires competencies such as critical thinking and the ability to interact with people from many linguistic and cultural backgrounds (cultural competency). Our ever changing workforce creates a critical need for innovation. (National Education association, 2011). “Today’s students need critical thinking and problem-solving skills not just to solve the problems of their current jobs, but to meet the challenges of adapting to our constantly changing workforce.” (Ken Kay, 2008)

The new social contract is different: only people who have the knowledge and skills to negotiate constant change and reinvent themselves for new situations will succeed. The 21st century skills would become even more important to organizations in the future, the skills and competencies will become more important to organizations in the next three to five years, particularly as the economy improves and organizations look to grow in a global marketplace. Fusing reading, writing and arithmetic’s and 21st century skills would ensure that students are better prepared to enter the workforce. Proficiency in reading, writing, and arithmetic is not sufficient if employees
are unable to think critically, solve problems, collaborate, or communicate effectively. (American Management Association, 2010)

It is clear that the 21st century skills need to be fully integrated into classrooms, schools, and districts around the country to produce citizens and employees adequately prepared for the 21st century. Workforce preparation is dependent on the ability of schools to promote students’ cognitive abilities, such as logical thinking, problem solving, analysis, careful observation, and data management. These abilities are highly valued in the workplace and vital to successful performance (Committee on Workforce Needs in Information Technology, 2001).

Pearson & Young, (2002) encourages schools to look beyond the schoolhouse to the roles students will play when they leave to become workers, parents, and citizens. Empirical research shows that small firms, in particular, contribute significantly to economic growth as measured by new job creation. Of these, the most innovative firms have been shown to create a disproportionately greater share of net new jobs than those firms with lesser innovative intensity suggesting that highly innovative new firms are a major source of economic growth. (BJK Associates, 2002). Highly innovative firms are more likely to form in labor market areas with a higher percentage of educated and skilled workers. A positive relationship may actually exist between the ‘size’ of a region’s knowledge base and new firm formation” (BJK Associates, 2002).

Education is essential to getting a high-paying job” (Bureau of Labor Statistics, Office of Occupational Statistics and Employment Projections, 2003). With our economy making such an unprecedented transition into high-skilled, information-based industries, not providing students with opportunities to develop 21st century skills and proficiencies will create a disconnect between the innovative jobs being created and the skills of the workforce (Chao, 2001).

2.3.3 Technological Advancement and 21st Century Skills
Rapid changes in technology is redefining the broad skill sets that students need to be adequately prepared to participate in and contribute to today’s society (Levy and Murnane 2005; Stewart 2010; Wilmarth 2010). Today’s children are “growing up digital.” Their view of the world is very
different from that of adults, thanks to unprecedented access to information, people, and ideas across highly interactive media. It is precisely this real-time, webbed interactivity, which has spurred societal changes in ways prior technologies did not. (Don Tapscott, 1998) “Our children are the latest model of human being. Looking at the world of children is not looking backward at our own past it’s looking ahead. They are our evolutionary future” (Douglas Rushkoff, 1999), “Consider any family of immigrants, “Who learns the language first? Who adopts the aesthetic, cultural, and spiritual values of the new country? The children, of course….Well, welcome to the 21st century. We are all immigrants in a new territory”. (Douglas Rushkoff, 1999). More than half the people in our nation and 65 percent of our children are now online. The latest research from the U.S. Department of Commerce puts the current growth rate for Internet use at 2 million new users per month, with children and teens being the fastest growing group of new users (Economics and Statistics Administration, 2002). We now use the internet for business transactions, shopping, entertainment, information searches, communication and of course, learning. Today, those technologies and the Internet have gained widespread public acceptance and use. This increased use is bringing rapid and radical change into our lives from the wonderfully beneficial to the terrifyingly difficult. (Kerry & Isakson, 2001). It is clear that, in today’s Digital Age, students must be technologically literate to live, learn, and work successfully. Most schools acknowledge the importance of technology to their students’ futures, but to date few have successfully incorporated technology into the mainstream of academic learning (Pearson & Young, 2002, pp. 104-105).

The Secretary’s Commission on Achieving Necessary Skills (SCANS) and the American Association of School Administrators include competency in the use of computers and other technologies as an essential skill for students in the 21st century (SCANS, 1992; Uchida, Cetron, & McKenzie, 1996). These reports assert that technological literacy is an essential component of job readiness, citizenry, and life skills. Students must not only become competent in the use of technology and associated applications; they also must be able to apply their skills to practical situations. Most experts agree that students should develop technological skills in the context of learning and solving problems related to academic content (Baker & O’Neil, 2003). According to Technically Speaking, a report by the National Academy of Engineering and the National Research Council, “Technologically literate workers are more likely than those lacking such
literacy to have a broad range of knowledge and abilities, such as the critical thinking skills identified by the Secretary’s Commission on Achieving Necessary Skills (SCANS)”

The challenge to educators is to help students develop the 21st century skills that enable them to fully realize technology’s most positive effects.

**a) Technology and Digital Economy**

We are living in a new economy, powered by technology, fueled by information, and driven by knowledge (Secretary’s Commission on Achieving Necessary Skills, 1991). Because of this, “The influence of technology will go beyond new equipment and faster communications as work and skills will be redefined and reorganized”. Despite the boom and bust of the dot-com craze, are cent University of California–Berkeley study finds that “the adoption of Internet business solutions has already yielded a current, cumulative cost savings of $155.2 billion to U.S. organizations” (Varian, Litan, Elder, & Shutter, 2002). A report by the U.S. Department of Commerce, attributes most productivity gains since 1995 to information technology (IT) and its resulting organizational change, despite the economic slowdown that began in 2000 and the economic repercussions of September 11(Economics and Statistics Administration, 2002).

Given the rapid diffusion of technology during the past 30 years, many analysts have also considered technological change to be a major factor in determining wages (Mishel, Bernstein, &Boushey, 2003). Studies estimate that, on average, IT jobs pay 85 percent more than other jobs (Pociask, 2002). The average wages per worker in IT industries are twice the national average for all workers engaged in private, nonfarm industries. (Economics and Statistics Administration, 2002). Even in non-IT industries, most analysts agree that technologically skilled workers are likely to earn higher wages than those without such skills. Workers who use a computer at work can earn 17 to22 percent more than other workers” (Economics and Statistics Administration, 2002).The rapid change and increased competition require that workers use their “soft skills” (e.g interpersonal, management, and problem-solving skills) to adapt quickly to changing technologies and organizational structures (Economics and Statistics Administration, 2002).Even economists who find it difficult to identify the role of technological change in recent wage trends agree with the assertion regarding the need for soft skills (Mishel et al. (2003). Mishel et al. (2003) cite a wage gap within groups of workers with similar education and experience as a
sticking point to more cut-and-dried theories relating technology to increased wages. They do say, however, that this within-group wage inequality can be related to technological change if it is interpreted as a reflection of growing economic returns to those worker skills (motivation, aptitudes for math, and others) that are not easily measured. In other words, simple technology proficiency is not enough. So experts agree: Education when it means developing the skills needed to live, learn, and work successfully in the Digital Age does pay, especially in an information-based economy (Mandel, 2002). Students require higher levels of the education to succeed in the new knowledge based economy, (CEO Forum, 2001).

b) Technology and Digital-Age Learning

Given the realities of globalization, knowledge work, and accelerating societal change, it’s obvious that what students learn as well as how and when they learn is changing. Over the last decade, there were tremendous advances in the science of learning, made possible by the convergence of research in the cognitive sciences, neuroscience, human development, and technology. As a result, we know more today about how people think and learn (Bransford, Brown, & Cocking, 1999).

Students learn more when they are engaged in meaningful, relevant, and intellectually stimulating work (Newmann, Bryk, & Nagaoka, 2001). While all learning is deeply personal, the frequency and relevance of such moments increase when technology enables us to tap outside experts; visualize and analyze data; link to real-world contexts; and take advantage of opportunities for feedback, reflection, and analysis (Bransford et al., 1999). Technology influences learning in three significant ways. A synthesis of recent research and national skill sets shows that technology can be a driver of change, a bridge to academic excellence, and a platform for informed decision making and accountability:

i) **A Driver for Change: The 21st Century Skills**; Technology has catapulted us into a knowledge based, global society. It is clear that success in this society will require significantly different skills than in the past (CEO Forum, 2001; International ICT Literacy Panel, 2002). However, policymakers and educators have not yet clearly defined what it means to be “educated” in a Digital Age. The irony of a call for 21st
21st century skills in this era of high-stakes testing based on conventional metrics is not lost on teachers. To fully realize the educational opportunities that 21st century skills can bring to students, education leaders must formally incorporate them into the mainstream of school curriculum, instruction, and assessment.

ii) A Bridge to High Academic Achievement; Technology serves as a bridge to more engaged, relevant, meaningful, and personalized learning all of which can lead to higher academic achievement. When technology is used appropriately, children learn more, even as measured by conventional tests (Newmann et al., 2001; Wenglinsky, 1998). It is important to demonstrate this research link to teachers, thereby encouraging them to incorporate technology into the mainstream of student learning.

iii) A Platform for Informed Decision Making and Accountability; Technology provides a platform for more informed decision making using timely, meaningful data to shape learning opportunities. This situation translates into more personalized learning based on continuous feedback available to students, teachers, and parents. The challenge lies in building such accountability systems on the foundation of the right indicators that lead to high academic standards and 21st century skills. Only this foundation will enable true Digital Age readiness.

2.3.4 Globalization and 21st Century Skills
Globalization is a combination of much freer trade in goods and services combined with free capital movements. The phenomenon dates far back in history with the development of international trade. However, for the past few years, we have observed a high acceleration in this trend due to a political and ideological environment eminently favourable to its development and rapid advances in technological innovation, especially in the area of telecommunications (Jacques Hallak, 1998). To meet the challenges of globalization, it would in fact appear necessary to prepare individuals for a workplace where responsibilities are constantly changing, where vertical management is replaced by networking, where information passes through multiple and informal channels, where initiative-taking is more important than obedience, and where
strategies are especially complex because of the expansion of markets beyond national borders. (Jacques Hallak, 1998)

In the context of changing production systems there is increasing recognition of the pivotal role of both education and training for both economic and social goals. No society can succeed in a globalised environment unless people have adequate knowledge and skills. These are vital not just for maintaining competitiveness and ensuring adaptable and productive enterprises but also for achieving personal and social development. (Ilo 1999). Educational planners wherever they come from must think seriously about the consequences of such a phenomenon, particularly in terms of shifts in the job market, in order to better adapt their country’s training system. Therefore, education must help individuals to perform tasks for which they were not originally trained, to prepare for a non-linear career path, to improve their team skills, to use information independently, to develop their capacity for improvisation as well as their creativity, and finally to lay the basis of complex thinking linked to the harsh realities of practical life. (Jacques Hallak, 1998).

2.4 Education Research, Learning and Learning Tools.

2.4.1 Education and the 21st Century Skills.

a) What is to be taught

There is a need to change curricula so that students develop competences which are needed in the 21st century (Anderson 2008; Voogt&Pelgrum, 2005). The debate should not only focus on what important 21st century competences are, but also where and how these competences can be acquired. Education needs to find a new balance between the pedagogical approaches that are considered useful in the industrial society and those that are deemed relevant for the information society or knowledge society. (Voogt, 2005)

Education is more than speaking a foreign language. It encompasses the development of skills and competencies essential to navigate through life and efficiently and effectively perform productive tasks necessary for maintenance and enhancement of life. It therefore has to be looked at holistically and not just as a process where children or individuals go through a school
system. It has to be viewed from the end product also; the graduates who will emerge from this system and the consequent society created. (Gitonga, 2010)

For students, proficiency in 21st century skills the skills, knowledge and expertise students must master to succeed in college, work and life should be the outcome of a 21st century education. To be “educated” today requires mastery of core subjects, 21st century themes and 21st century skills. To help students achieve proficiency in 21st century skills, teachers and administrators need education support systems that strengthen their instructional, leadership and management capacity. And both students and educators need learning environments that are conducive to produce results. (Partnership for 21st Century Skills, 2007).

A successful 21st century education should prepare students to be successful, contributing citizens in the context of today’s global society. Success in the 21st century requires students to understand how to learn independently. It is necessary to develop strong critical thinking and interpersonal communication skills, both written and oral, in order to be successful in an increasingly fluid, interconnected, and complex world. Instruction should focus on the development and use of skills such as critical thinking and problem solving, written and oral communication, collaboration, creativity and innovation. 21st century learning builds upon such past conceptions of learning as “core knowledge in subject areas” and recasts them for today’s world and today’s learners where a global perspective and collaboration are critical skills (McLeod, 2010). Schooling needs to be fundamentally reconfigured to emphasize higher order cognitive processes such as critical thinking, creative problem solving, curiosity, and adaptability. (Keengwe, Onchwari&Wachira, 2008; Kozma, 2003; Zhao, 2009).

Schools must teach disciplinary knowledge in ways that also help students learn how to learn, so that they can use knowledge in new situations and manage the demands of changing information, technologies, jobs, and social conditions. (Stanford Center for Opportunity Policy in Education, 2010). To achieve success, our students will need to develop new skills and attain proficiency in different areas than in the past. Leaders in education and business agree that 21st century skills and content in areas such as critical thinking, productivity, teamwork, cultural competence, interactive communication, technology, and systems thinking are needed to succeed
in school, work, and life. Core academic subjects such as reading, writing, science, math, languages, social studies, and the arts remain the foundation of a comprehensive education and are more important than ever. However, we must also develop students who have the ability to think critically, apply knowledge at high levels, and use technology and tools to access, evaluate, and communicate information. Both rigorous academic standards and 21st-century skills are a bridge to authentic, intellectually challenging work by students in a world that holds unprecedented opportunities for education, personal growth, and fulfillment as well as global communication, resource scarcity, conflict, and problem solving. (Catalina Foothills School District, 2006)

b) Assessment and the 21st Century Skills.
Greaney (2001) defines assessment as any procedure or activity that is designed to collect information about the knowledge, attitude, or skills of the learner or group of learners. Assessment is therefore a process through which the quality of an individual’s work or performance is judged. Current assessment practices need to reflect changes based on new understandings of learning theories, new curricula that are being developed, new knowledge and skills that are necessary for the 21st Century and the accountability requirements of systems and governments, (Segers et al 2003). Current learning theory emphasises the importance of learning with understanding (Bransford et al., 2000). This means that curriculum and teaching approaches should emphasize understanding rather than memorization, should provide opportunities for in-depth study to allow for firm foundation of knowledge and conceptual development and should enhance student abilities to recognize and use meaningful patterns of information. Assessment processes, then, should enable students to demonstrate deep understanding of concepts rather than surface knowledge and recall of facts. Assessment should be able to reveal the quality of students’ understanding and thinking as well as specific content or processes.

People have a natural propensity to learn and they develop deep knowledge organized around important conceptual frameworks. (Bransford et al, 2000). Knowledge developed in this context facilitates problem solving and encourages new knowledge to be created. Assessment, then, should be contextualized and allow students to show deep understanding of concepts and reveal
relationships between concepts and conceptual frameworks. Assessment processes should emphasize students’ ability to link ideas, apply knowledge and solve problems. (Assessment and reporting unit, 2005).

2.5 21st Century Frameworks that Arise

The prominent need for 21st century skills is an issue across different frameworks developed by various researchers. This need for 21st century skills is mostly attributed to the changes in society such as need for sustainable development, and more particularly, to the rapid development of technology and its impact on the way we live, work and learn. Through Information and Communication Technology our society is changing from an industrial society to information or knowledge society (Voogt, 2008). While in the industrial society the main focus of education was to contribute to the development of factual and procedural knowledge. In the era of information or knowledge society the development of conceptual and meta-cognitive knowledge is increasingly considered important (Anderson 2008).

Some frameworks also stress the changes in economy and the labor market caused by globalization and internationalization as one of the important driving forces for the need of 21st century skills. The need for individuals to flexibly adapt to a changing society as well as the need for sustainable democratic development such as those of the European union are mentioned by a few frameworks. In the latest developments on educational research learning and learning tools are regarded as an argument for 21st century skills (Partnership for 21st-century skills and En Gauge, 2011).

The frameworks have been addressed in previous section above. Education process over the years has been guided by Bloom’s Taxonomy by Benjamin Bloom (1956) and revised later to suit the 21st Century skills. This is explored in the section below. Blooms approach will guide the research project and is explored below.
2.5.1 Education related

a) Blooms Taxonomy

Background

Blooms Taxonomy is one of the learning taxonomies known. A taxonomy defined in the field of education is classification system (Woolfolk, 1993). Taxonomies in education have focused mainly on evaluation and objectives. Bloom, Engelhart, Furst, Hill, & Krathwohl, (1956) and Krathwohl et al. (1964), described a taxonomy in the context of educational objectives as:

“A true taxonomy is a set of classifications which is ordered and arranged on the basis of a single principle or on the basis of a consistent set of principles. Such a true taxonomy may be tested by determining whether it is in agreement with empirical evidence and whether the way in which the classifications are ordered corresponds to a real order among the relevant phenomena. The taxonomy must also be consistent with sound theoretical views available in the field...finally, a true taxonomy should be of value in pointing to phenomena yet to be discovered. (Krathwohl, et al., 1964, p. 11).

i. Original Version

The single most pervasive taxonomy in education is Bloom’s taxonomy (Bloom, et al., 1956). It was intended to help teachers, administrators, professional specialists, and research workers discuss and deal with curricular and evaluation problems (p. 1). Five principles for it’s hierarchical structure have been identified over time through reviews, according to Moore (1982). Hill (1984) noted four salient features of Bloom’s taxonomy that could be applied to other taxonomies, that is, existence of classes, hierarchical classes ordered in terms of complexity, cumulative nature and generality in the processes of the various classes. The objectivity of the parts, the ability to organize behavior into categories and the pyramid like structure of the hierarchy made Bloom’s cognitive domain taxonomy relevant to many different fields of education. Therefore, it has greatly facilitated the development of educational curricula and evaluation devices. Bloom, et al. (1956) wanted to create "a theoretical framework which could be used to facilitate communication among examiners." The committee members felt that taxonomy was an economical way to facilitate meaningful dialogue in their professional field of education. The education community accepted Bloom’s taxonomy because of it’s versatility and
appropriate symbols, precise and usable definitions, and consensus from those who reviewed and used it.

**Figure 2.1** Bloom's Digital Taxonomy Structure

![Bloom's Taxonomy Diagram]

At the dawn of the 21st Century, there has been need to review the previous Blooms to transform them to suit 21st First century learning. This is given in the next section.
ii. *Revised 21\textsuperscript{st} Century Version:*

**Figure 2.2 Bloom’s Digital Taxonomy Map**

Elements in italics are new digital verbs.

| **Evaluating** | Checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, \textit{blog/vlog-commenting}, \textit{reviewing}, \textit{posting}, \textit{moderating}, \textit{collaborating}, \textit{networking}, refactoring, \textit{alpha/beta testing} |
| **Analyzing** | Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, \textit{mashing}, \textit{linking}, \textit{tagging}, \textit{validating}, \textit{reverse-engineering}, \textit{cracking} |
| **Understanding** | Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying, \textit{advanced searches}, \textit{Boolean searches}, \textit{blog journaling}, twittering, categorizing, commenting, annotating, subscribing |
| **Remembering** | Recognizing, listing, describing, identifying, retrieving, naming, locating, finding, \textit{bullet pointing}, \textit{highlighting}, \textit{bookmarking}, \textit{social networking}, \textit{social bookmarking}, favoriting/local bookmarking, searching, googling |
2.5.2 Theoretical Framework of the Study

The new version is guided by the object of the study according to Blooms Taxonomy, revised version. This is because it applies best to 21st Century skills and is reflective of these.

Figure 2.3 Theoretical Framework.

Aligning instructional objectives to 21st century learning. 
(students acquire 21st century skills)

Students employ 21st century skills. Ie become critical thinkers and problem solvers, teachers make classroom test constructed in line with 21st century skills by applying blooms taxonomy.

21st century graduates

Students fit in the 21st century world.
CHAPTER THREE
METHODOLOGY

3.1 Introduction
The chapter focuses on the research methodology that was used in the study to achieve the objectives of the study based on research questions. It presents the research design, sample and sampling procedure, research instrument that was adopted in the study. It also explains the validity and reliability of the research instrument.

3.2 Research Design
The research design was descriptive research in nature. A descriptive study is one where by information is collected without changing the essence of the construct being or environment. Nothing is manipulated. The studies based on descriptive could be “correlation” or “observational” studies. A descriptive study provides information about the naturally occurring status, behavior, attitudes or other characteristics of a particular group. It is used to describe what is in existence in respect to conditions or variables that are found in a given situation. It is the study of how a particular group, person, or thing behaves. Observations are noted without influence. Descriptive studies can also be conducted to demonstrate associations, relationships between things for which research is desired. This study investigated the extent to which 21st Century skills are evidenced.

Descriptive research takes that form of survey, case study and observational. This study was more of a case study applying survey applications. The study was based on teacher’s knowledge and perception of students’ evidence of 21st Century skills. The coverage was based in one district and the schools around that place. Therefore it was not possible to generalize the results across the country or Africa. However it was possible to generate hypothesis for further testing towards generalized results. This also spells limitation in the way the research was designed. However the design did not compromise the outcome of the research for the purposes intended, that is to get a perspective of practice and embracement of 21st Century skills. A survey method was applied as questionnaires were used. For surveys to be credible the instruments must be reliable and valid, a component that was addressed in the research design process and instrumentation criteria. Descriptive studies, in which the researcher interacts with the
participant, may involve surveys or interviews to collect the necessary information. Descriptive studies in which the researcher does not interact with the participant include observational studies of people in an environment and studies involving data collection using existing records (e.g., medical record review).

3.3 Target Population
The population constituted those who are directly concerned with ensuring 21st Century skill acquisition within the teaching learning process. The research targeted teachers and head teachers who teach and manage schools at secondary school level. This is because it is at this level that learning is elevated towards higher order learning cognitive process of critical thinking and creativity. Further it is at this level that critical aspects of 21st Century skills happen (should they do) and can be evidenced or determined. The study targeted a cohort group of graduate teachers who have had similar training thus creating harmony and reducing elements of variability. The target population consisted of teachers and head teachers from the 16 secondary schools in Mathira East District. There are 192 teachers and 16 head teachers. A target population is defined as all members of a real hypothetical set of people, events or objects to which a researcher wishes to generalize the results of the research study (Borg and Gall, 1989).

3.4 Sample Size and Sampling Procedure
3.4.1 Sample Size
A sample design is a plan determined before data is collected for obtaining a sample from a given population (Ordho and Kombo, 2002). A sample is a small proportion of a population selected for observation and analysis (Best and Kaln, 1989). An ideal sample should be a large enough depending on the research purpose and design to serve as an adequate representative of the population about which the researcher wishes to generalize. It should also be feasible in terms of subject availability and expenses in both time and resources. The number of teachers was chosen on a criterion that would scientifically help address the issue. Further this was a research project that did not require absolute size applications of sample size determination.
Table: 3.1 Sample Size Determinations

| Total Number of Teachers in Mathira East District (192) | Number of graduates (x=40 Teachers) ; (x=10 Head Teachers) | Preferred Number for the sample appropriate (20) |

3.4.2 Sample Selection

This section describes the procedure used in sampling and gives the sample sizes for the teachers and principals. Sampling is the process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group. The target population was decided, as graduate secondary school teachers. The researcher used purposive sampling to select 40 teachers and 10 head teachers. Assuming as stated earlier that the teachers bear similar characteristics having been trained the same and that the curriculum as set out was common across all schools and order of teaching was the same. Also the preparation for examinations was common across all schools. In this case a purposive sample was thought applicable and appropriate. The only thing was that schools were considered as to whether they are male only, female of mixed. It was thought interrelationships that arise could be an effect but not enough to change the outcome of the study.

3.5 Data Collection Instruments

3.5.1 Questionnaire

A questionnaire was designed by the researcher as the research instrument. A questionnaire is a carefully designed instrument for collecting data in accordance with specification of the research questions. The questionnaire approach was preferred due to their suitability for this study. Questionnaires are commonly used to collect important information about a population (Mugenda and Mugenda, 1999). Each item in the questionnaire was developed to address a specific research issue of the study. The choice also depended on the sample as they should have intellect and an understanding to follow and respond to the questionnaire as desired.
3.6 Validity and Reliability issue:
The questionnaire collected data from the secondary school teachers. This questionnaire had two sections. Section one of short answered questions on school and demographic data of the teachers. Section two consisted of closed ended questions and open ended questions on the actual topic relating to the objectives.

3.6.1 Validity of Instruments
Reliability and validity are mechanisms employed in order to determine whether the information obtained can be an accurate source for conclusive findings. For validity the test must measure what it is supposed to measure. Validity indicates the degree to which an instrument measures what it is supposed to measure (Kothari, 2004) the questionnaire was well structured to ensure that it remains focused, accurate and consistent in the course of the study. Simple language was used in the research instrument to avoid any ambiguity since explanation given was true for validity.

3.6.2 Reliability of Instruments
Reliability is the consistency in results from the test at different times (Kombo and Tromp, 2008). Reliability is important because it enables the researcher to identify misunderstandings, ambiguities and inadequate items in the research instruments and make the necessary adjustments so that data collected can have more reliability. This was achieved through test-retest method and making necessary changes to the research instruments.

3.7 Data collection Procedure
Data was collected using self-administered questionnaire and an interview schedule. The questionnaire was appropriate because it saves on time and the targeted respondents are literate as well as ensuring uniformity in the way questions are asked. Equally respondents feel free to answer sensitive questions if they are not required to disclose their identity (Mulusi, 1988) as cited by (Mugambi, 2006).
3.8 Data analysis procedure

In selecting a method for analysis the researcher considered the chain of operations that the research was addressing in the purpose and design. This was guided by the input, the theory and data from which the analysis shall start. Another important question was whether the procedure will produce desired output, the results which were intended and results that can be used. All the links from the research were taken into account when selecting the method of analysis, though the targets of the project may make some of them more important than the others.

The research used descriptive research related to means, standard deviation, variance, frequencies, proportions which were presented in table forms and graphs for comparison. This helped to draw inferences over teachers’ knowledge on the 21st century assessment skills and how they use classroom based assessments as form of assessment to help learners acquire the 21st century skills.
CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction
This chapter deals with the analysis of data, presentation and interpretation, which was collected from ten schools. The analysis was aimed at addressing the purpose and objectives of the study based on how teachers use classroom-based assessment to enhance learner’s acquisition of 21st century skills. The data was collected and interpreted according to research questions.

4.2 The questionnaire return rate
The questionnaire return rate was tabulated in Table 4.1. Knowledge of the questionnaire return rate would enable the researcher to acquire data to answer the research questions of the study.

Table 4.1 Respondent questionnaire return rate

<table>
<thead>
<tr>
<th>Type of respondent</th>
<th>No of questionnaire Issued</th>
<th>No of questionnaire Returned</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>40</td>
<td>36</td>
<td>90</td>
</tr>
<tr>
<td>Principals</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>46</td>
<td>190</td>
</tr>
</tbody>
</table>

The questionnaires return rate was 90% which is appropriate as it is more than 30% that is expected.

4.3 Demographic Information of teachers
The teachers were asked to state their gender, their highest level of academic qualification, total number of years of service in secondary school and their subject combinations. The demographic data would help the researcher to understand the respondents’ background and relate it to the objectives of the study. The results are as given in the tables below.

4.3.1 Gender of Teachers
The teachers were asked to give their gender. They gave the following information as given in Table 4.2
Table 4.2 Gender of the teachers

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MALE</td>
<td>24</td>
<td>66.7</td>
<td>66.7</td>
<td>66.7</td>
</tr>
<tr>
<td>FEMALE</td>
<td>12</td>
<td>33.3</td>
<td>33.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The gender distribution of teachers was such that there were more males 24 (66.7%) against 12 (33.3%) females. The small percentage of females could relate to the few number of female teachers in the district.

4.3.2 Academic qualification of teachers

The teachers were asked to give their highest academic qualification by ticking. This was limited to only diploma and degree levels. They gave the following information as given in Table 4.3

Table 4.3 Academic qualification for teachers.

<table>
<thead>
<tr>
<th>EDUCATION</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIPLOMA</td>
<td>16</td>
<td>44.4</td>
<td>44.4</td>
<td>44.4</td>
</tr>
<tr>
<td>DEGREE</td>
<td>20</td>
<td>55.6</td>
<td>55.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The data shows that 16 (44.4%) of the teachers had qualified up to the diploma level while 20 (55.6%) had degree qualification.

4.3.3 Teaching experience for teachers

The teachers were asked to give the number of years that they have taught in secondary school by ticking against various year limits. They gave the following data shown in table 4.4
Table 4.4 Teaching experience for teachers.

<table>
<thead>
<tr>
<th>EXPERIENCE</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>0-5</td>
<td>8</td>
<td>22.2</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>5-10</td>
<td>14</td>
<td>38.9</td>
<td>61.1</td>
</tr>
<tr>
<td></td>
<td>10-20</td>
<td>10</td>
<td>27.8</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>OVER 20</td>
<td>4</td>
<td>11.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

It is clear that most teachers had 5-10 (38.9%) years experience of teaching in a secondary school while 22.2% had 0-5 years, 27.8% had 10-20 years and the rest had over 20 (11.1%) years of teaching in a secondary school.

4.3.4 Teachers teaching subjects

The teachers were asked to indicate their teaching subjects. They gave the following response in table 4.5

Table 4.5 Teaching subjects

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>SCIENCES</td>
<td>12</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>ARTS/HUMANITIES</td>
<td>10</td>
<td>27.8</td>
<td>61.1</td>
</tr>
<tr>
<td></td>
<td>MATHEMATICS</td>
<td>8</td>
<td>22.2</td>
<td>83.3</td>
</tr>
<tr>
<td></td>
<td>LANGUAGES</td>
<td>6</td>
<td>16.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to the data there were more responses from teachers in the science department 12 (33.3%). 10 (27.8%) teachers in the arts/humanities, 8 (22.2%) teachers in mathematics and 6 (16.7%) in the languages department.
4.4 Knowledge of 21st Century Skills

4.4.1 Derived and agreed upon 21st Century Skills

The teachers were asked to indicate on the most appropriate skill for students to survival in the changing world context of technological age and global market economy. They gave the following data as on table 4.6

Table 4.6 Appropriate skills for survival in the changing world context.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical thinking</td>
<td>14</td>
<td>10.6</td>
</tr>
<tr>
<td>Creativity/innovation</td>
<td>22</td>
<td>16.7</td>
</tr>
<tr>
<td>Problem solving</td>
<td>18</td>
<td>13.6</td>
</tr>
<tr>
<td>Collaboration/teamwork</td>
<td>18</td>
<td>13.6</td>
</tr>
<tr>
<td>Learning to learn</td>
<td>12</td>
<td>9.1</td>
</tr>
<tr>
<td>Communication</td>
<td>23</td>
<td>17.4</td>
</tr>
<tr>
<td>Computer skills</td>
<td>25</td>
<td>18.9</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>132</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Figure 4.1 Graph on teachers’ response on the appropriate skills for survival in the changing world context.
Teachers seem to recognize that all the skills given are appropriate for students in the 21st century computer skills 25(18.9%), communication 23(17.4%) creativity/ innovation 22(16.7%), problem solving 18(13.6%), collaboration/teamwork 18(13.6%) and learning to learn 12(9.1%).

4.4.2 Teachers response on the importance of the skills.

The teachers were asked to give reasons why these skills were necessary. The teachers gave the following responses as shown in table 4.7

Table 4.7 Reasons why the skills were necessary

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>To meet global market demands</td>
<td>15</td>
<td>22.7</td>
</tr>
<tr>
<td>To meet technological demands</td>
<td>14</td>
<td>21.2</td>
</tr>
<tr>
<td>To meet shifting workplace demands</td>
<td>11</td>
<td>16.7</td>
</tr>
<tr>
<td>To enhance advancement in scientific literacy.</td>
<td>13</td>
<td>19.7</td>
</tr>
<tr>
<td>Economic competitiveness</td>
<td>7</td>
<td>10.6</td>
</tr>
<tr>
<td>None of the above</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>9.0</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 4.2 Graph on teachers’ response on the importance of the 21st Century Skills.
Overall the teachers are able to link the importance to the context of the 21st century. From table 4.7 more teachers 15 (22.7%) indicated that the skills were necessary to meet the global market demands to some extent followed by technological demands 14(21.2%) and shifting work demands 13 (19.7%). Advancement in scientific literacy 13(19.7%) and economic competitiveness 7(10.6%) would be contributing factors to why learners require the skills. Other factors such as entrepreneurship self dependence were noted to have influence accounting to 6 (9%).

4.4.3 Teachers response on pedagogic or teaching strategies towards 21st century.

The teachers were requested to indicate pedagogic strategies that would be desirable for 21st century. The data was summarized in table 4.8

Table 4.8 Teachers response on pedagogic or teaching strategies

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.14</td>
<td>.229</td>
<td>1.376</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>1.97</td>
<td>.216</td>
<td>1.298</td>
</tr>
<tr>
<td>ABILITY TO Classify</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.53</td>
<td>.216</td>
<td>1.298</td>
</tr>
<tr>
<td>ABILITY TO Compile</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.56</td>
<td>.209</td>
<td>1.252</td>
</tr>
<tr>
<td>ABILITY TO Explain</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.22</td>
<td>.211</td>
<td>1.267</td>
</tr>
<tr>
<td>ABILITY TO Understand</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.17</td>
<td>.220</td>
<td>1.320</td>
</tr>
<tr>
<td>ABILITY TO Analyse</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.50</td>
<td>.234</td>
<td>1.404</td>
</tr>
<tr>
<td>ABILITY TO Compare</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.44</td>
<td>.209</td>
<td>1.252</td>
</tr>
<tr>
<td>ABILITY TO Present</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.08</td>
<td>.205</td>
<td>1.228</td>
</tr>
<tr>
<td>META COGNITION</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.33</td>
<td>.215</td>
<td>1.287</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.50</td>
<td>.227</td>
<td>1.363</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
With a scale of 1(strongly agree) to 5(strongly disagree)majority of the teachers agreed that learners ability to solve problems by applying acquired knowledge in a different way (mean 1.97) is the most necessary pedagogic strategy for the 21st century. Learners ability to present and defend opinions (mean 2.08), learners ability to recall previously learnt materials (mean 2.14), learners ability to demonstrate understanding and comprehend facts and ideas (mean 2.17), learners ability to show and explain ideas and action to each other (mean 2.22), learners ability to analyze ideas (mean 2.50), learners ability to classify ideas (mean 2.53 ), and the knowledge and control learners have over their own thinking and learning activities (mean 2.33). Most of the teachers perceived the above pedagogic strategies as being necessary for 21st century.

Also most of the teachers agree that learner’s ability to compare and contrast ideas (mean 3.44), learners ability to compile information together in a different way by combining elements in a new way (mean 3.56) and learners’ motivation (mean 3.50 ) are not that necessary pedagogic strategies for 21st century. Teachers are familiar and seem to apply typical pedagogic strategies of recall, application, classification, compile, explain, understand etc but they do not seem to be familiar with what most deserves for 21st century skills such that the implication is not geared towards literacy, using judgment and values on concepts.

4.4.4 Assessments/examinations useful for effective learning in the 21st century
Teachers were asked to indicate on the kind of examinations/ assessments that would be useful as tools for effective learning of the 21st century skills. They gave the information shown in table 4.9
Table 4.9 Teachers’ response on the kind of assessments/examinations.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC NATIONAL EXAMS</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.97</td>
<td>.084</td>
<td>.506</td>
</tr>
<tr>
<td>HOMEWORK/ASSIGNMENTS</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.42</td>
<td>.108</td>
<td>.649</td>
</tr>
<tr>
<td>CLASSROOM EXAMS</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.28</td>
<td>.094</td>
<td>.566</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was no significant difference in participants’ perceptions on the effectiveness of the above assessment/examination tools in the learning of the 21st century skills. On a scale of 1(yes), 2(not necessary) and 3(yes) homework’s/assignment had the highest mean rank (2.42). In contrast classroom examinations had the lowest mean rank (1.28). And therefore most teachers perceived classroom examinations as the most effective tools in the learning of the 21st century skills.

4.5 Learner assessment practices in regards to 21st century Skills

4.5.1 Teachers response on how often they examine/assess in class

In order to gather information on how frequent teachers do assess students in the classroom setting teachers were asked to indicate how often they do assess their students in class. The data is summarized as shown in table 4.10

Table 4.10 Teachers response on frequency of assessment

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Fortnightly</td>
<td>2</td>
<td>5.6</td>
</tr>
<tr>
<td>Monthly</td>
<td>14</td>
<td>38.9</td>
</tr>
<tr>
<td>Half-termly</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>Termly</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>On continuous basis</td>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td>As need arises</td>
<td>2</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
According to the table it was clear that most teachers do assess their students on monthly basis 14(38.9%). To some extent they do it half-termly 9(25%), termly 5(13.9%). It is also clear that teachers rarely do assess students on continuous basis 3(8.3%), when need arises 2(5.6%) and on daily basis 1(2.8%).

4.5.2 Assessment of concepts in classroom setting to effectively help students learn the 21st century skills

The teachers were asked to tick whether the following concepts would be tested within a classroom setting in order to effectively help students learn the 21st century skills. Table 4.11 below summarizes the information gathered.
There were significant differences in participants’ perception on the testing of the following concepts within a classroom setting in order to effectively help students learn the 21st century skills. On scale of 1(yes), 2 (no) and 3(not necessary) learner ability to recall had the lowest mean (1.14), learners ability to explain(mean 2.08) and learners motivation (2.08) had the highest mean. And therefore most of the teachers perceived the learners ability to recall as the most testable concept in order to help them learn the 21st century skills.

4.5.3 Response on assessment of concepts in the classroom.
In order to assess the extent to which teachers assess/test students in the 21st century skills the teachers were requested to give information whether they do assess students in the following concepts. Teachers were also asked to give information on their willingness to assess the following concepts and indicate whether it would be possible or never required in their teaching. The information collected is summarized in the table 4.12
Table 4.12 Response on whether they do assess/test the following concepts in the classroom.

<table>
<thead>
<tr>
<th>Concept</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>1.58</td>
<td>.967</td>
<td>.936</td>
</tr>
<tr>
<td>ABILITY TO UNDERSTAND</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.08</td>
<td>1.317</td>
<td>1.736</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.19</td>
<td>1.305</td>
<td>1.704</td>
</tr>
<tr>
<td>ABILITY TO ANALYSE</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.67</td>
<td>1.434</td>
<td>2.057</td>
</tr>
<tr>
<td>ABILITY TO CLASSIFY</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.61</td>
<td>1.420</td>
<td>2.016</td>
</tr>
<tr>
<td>ABILITY TO COMPARE</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.61</td>
<td>1.420</td>
<td>2.016</td>
</tr>
<tr>
<td>ABILITY TO COMPILATE</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.83</td>
<td>1.254</td>
<td>1.571</td>
</tr>
<tr>
<td>ABILITY TO PRESENT</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.92</td>
<td>1.131</td>
<td>1.279</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.92</td>
<td>1.317</td>
<td>1.736</td>
</tr>
<tr>
<td>META COGNITION</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.67</td>
<td>1.219</td>
<td>1.486</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.22</td>
<td>1.017</td>
<td>1.035</td>
</tr>
</tbody>
</table>

On a scale of 1(yes), 2(no), 3(not always), 4(willing but not possible) and 5(willing but not required). It was clear that majority of teachers do assess learner’s ability to recall previously learned material (mean 1.58). It was also clear that teachers rarely access learners’ motivation. (Mean 3.22). They do get it impossible to assess or not required in their assessment practices.

4.5.4 Teachers response on how they do assess students in the following learning processes while teaching.

Teachers were asked to indicate on how they do assess the students in the following learning processes while teaching. Teachers were expected to tick on the various classroom assessment strategies they use to assess students on the following learning processes while teaching. The information collected is summarized in table 4.1
It was clear from table 4.13 that teachers mostly do assess learner’s ability to recall previously learned material and to demonstrate understanding of facts and ideas by the learners giving their own point of view 18 (29.5%) although a large proportion of teachers also use oral tests 16 (26.2%). Teachers also use oral test 14 (31.8%) and easy test 13 (29.5%) in order to assess learners’ ability to solve problems by applying acquired knowledge in a different way, to analyze, classify, compare and contrast ideas and to compile information together in a different way by combining elements in a new way while teaching. In assessment of learners’ ability to present and defend opinions, to show and explain ideas and action to each other, majority of the
teachers who do assess the students in the following learning process use oral tests 21(42.9%). Although teachers do not assess the knowledge and control students have over their own thinking and learning activities and learners motivation those who do assess the learning process mostly use oral tests 7(58.3%), 6(50%) respectively.

From the data it is clear that teachers rarely use projects and group work as assessment strategies in classroom in order to assess students in the following learning processes.

4.5.5 Teachers response on how they do assess students in the following learning processes during mid-term and end of term assessments

Teachers were asked to indicate on how they do assess the students in the following learning processes in their midterm and end of term assessments. Teachers were expected to tick on the various classroom assessment strategies they use to assess students on the following learning processes in their midterm and end of term assessments. The information collected is summarized in table 4.14and table 4.15
Table 4.14 Response on how teachers assess the following learning process in their midterm assessments.

<table>
<thead>
<tr>
<th>ASSESSMENT PROCESS</th>
<th>ORAL TEST</th>
<th>PROJECTS</th>
<th>ESSAY</th>
<th>GIVING POINT OF VIEW</th>
<th>MULTIPLE CHOICE</th>
<th>FILL IN BLANK</th>
<th>GROUP WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>11</td>
<td>3</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>33.93%</td>
<td>19.64%</td>
<td>5.36%</td>
<td>41.07%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO UNDERSTAND</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>9</td>
<td>4</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>36.84%</td>
<td>15.79%</td>
<td>7.02%</td>
<td>40.35%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>18</td>
<td>3</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>31.82%</td>
<td>27.27%</td>
<td>4.55%</td>
<td>36.36%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO ANALYZE</td>
<td>0</td>
<td>0</td>
<td>26</td>
<td>13</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>61.90%</td>
<td>30.95%</td>
<td>0.00%</td>
<td>7.14%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO CLASSIFY</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>37.50%</td>
<td>37.50%</td>
<td>0.00%</td>
<td>25.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO COMPARE</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td>11</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>55.81%</td>
<td>25.58%</td>
<td>0.00%</td>
<td>4.65%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO COMPILE</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>35.71%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>64.29%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO PRESENT</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>13</td>
<td>0</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>39.53%</td>
<td>30.23%</td>
<td>0.00%</td>
<td>30.23%</td>
<td>0.00%</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
<td>7</td>
<td>0</td>
<td>13</td>
<td>11</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>19.44%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>30.56%</td>
<td>0.00%</td>
<td>13.89%</td>
<td>0.00%</td>
</tr>
<tr>
<td>METACOGNITION</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>66.67%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>11.11%</td>
<td>0.00%</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>40.00%</td>
<td>20.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>
Table 4.15 Response on how teachers assess the following learning process in their end of term assessments.

<table>
<thead>
<tr>
<th></th>
<th>ORAL TEST</th>
<th>PROJECTS</th>
<th>ESSAY</th>
<th>GIVING POINT OF VIEW</th>
<th>MULTIPLE CHOICE</th>
<th>FILL IN BLANK</th>
<th>GROUP WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ABILITY TO RECALL</strong></td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>6</td>
<td>4</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>32.08%</td>
<td>11.32%</td>
<td>7.55%</td>
<td>49.06%</td>
<td>1.89%</td>
</tr>
<tr>
<td><strong>ABILITY TO UNDERSTAND</strong></td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>7</td>
<td>6</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>34.62%</td>
<td>13.46%</td>
<td>11.54%</td>
<td>40.38%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO APPLY</strong></td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>11</td>
<td>4</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>32.14%</td>
<td>19.64%</td>
<td>7.14%</td>
<td>41.07%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO ANALYZE</strong></td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>11</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>62.79%</td>
<td>25.58%</td>
<td>2.33%</td>
<td>9.30%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO CLASSIFY</strong></td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>50.00%</td>
<td>25.00%</td>
<td>0.00%</td>
<td>25.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO COMPARE</strong></td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>14</td>
<td>9</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>45.83%</td>
<td>29.17%</td>
<td>0.00%</td>
<td>6.25%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO COMPILE</strong></td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>29.41%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO PRESENT</strong></td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>12</td>
<td>0</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>43.90%</td>
<td>29.27%</td>
<td>0.00%</td>
<td>26.83%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>ABILITY TO EXPLAIN</strong></td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>50.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>METACOGNITION</strong></td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>63.64%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>9.09%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>MOTIVATION</strong></td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>11.11%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>33.33%</td>
<td>22.22%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

It was clear that from table 4.14 and table 4.15 that teachers mostly do assess learner’s ability to recall previously learned material and to demonstrate understanding of facts and ideas by the learners filling in the blank spaces in their mid and end of term exams. Most teachers use essay
test in order to assess learners’ ability to solve problems by applying acquired knowledge in a
different way, to analyze, classify, compare and contrast ideas and to compile information
together in a different way during the mid and end of term assessments. In assessment of
learners’ ability to present and defend opinions, to show and explain ideas and action to each
other, majority of the teachers who do assess the students in the following learning process use
oral tests. Although most teachers do not assess the knowledge and control students have over
their own thinking and learning activities and the learners motivation those who do assess the
knowledge and control students have over their own thinking and learning activities mostly use
essay tests. For those who do assess learners’ motivation majority use the learners’ point of view
in their mid term and end of term assessments. From the data it was clear that teachers rarely use
projects and group work as assessment strategies in classroom in order to assess students in the
following learning processes.

4.6 Teacher competency across suitable 21st Century assessment strategies

4.6.1 Appropriateness of assessment strategies
Teachers were asked to give information on the assessment strategies that they would wish to
apply during the teaching learning process but they do not apply to their daily assessments. The
information collected is summarized as in the table 4.16.

Table 4.16 Response on assessment strategies that they would wish to apply but they are not
applicable to their teaching.

<table>
<thead>
<tr>
<th>Processes of learning</th>
<th>Oral test</th>
<th>Projects</th>
<th>Essay test</th>
<th>Giving ones Point of View</th>
<th>Multiple choice</th>
<th>Fill in the blank</th>
<th>Group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2 (4.7%)</td>
<td>13 (30.2%)</td>
<td>5 (11.6%)</td>
<td>4 (9.3%)</td>
<td>6 (14.0%)</td>
<td>3 (7.0%)</td>
<td>10 (23.3%)</td>
</tr>
</tbody>
</table>
Figure 4.4 graph of teachers’ response on assessment strategies that they would wish to apply but they are not applicable to their teaching.

From the data it was evident that teachers rarely use projects and group work as assessment strategies. Most of the teachers feel that project and group work as assessment strategies would not apply to their teaching learning processes 13(30.2%), 10(23.3%) respectively.

4.6.2 Competency in Assessment Strategies

Teachers were asked to give information on the assessment strategies that they would wish to apply during the teaching learning process but they do not have the necessary skill to make the assessment strategies. The information collected was summarized as in the table 4.17.

Table 4.17 Teachers response on assessment strategies that they would wish to use but they are not competent in.

<table>
<thead>
<tr>
<th>Processes of learning</th>
<th>Oral testing</th>
<th>Project work</th>
<th>Essay testing</th>
<th>To give ones Point of View</th>
<th>Multiple choice</th>
<th>Fill in the blank</th>
<th>Group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>4</td>
<td>21</td>
<td>0</td>
<td>3</td>
<td>9</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>9.3%</td>
<td>72.1%</td>
<td>0%</td>
<td>6.9%</td>
<td>20.9%</td>
<td>0%</td>
<td>13.9%</td>
<td></td>
</tr>
</tbody>
</table>
From the data it was evident that teachers rarely use projects as an assessment strategy. Most of the teachers do not have the necessary skills to use projects as an assessment strategy 21 (72.1%).

4.7 Demographic data of principals
The study looked into gender, age, academic qualifications and teaching experience of the following respondents. This would enable the researcher to understand the respondents and make conclusions on the study.

4.7.1 Gender of principals
The principals were asked to state their gender. They gave the following data tabulated in Table 4.18
Table 4.18 Gender of the principals.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MALE</td>
<td>6</td>
<td>60.0</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td>FEMALE</td>
<td>4</td>
<td>40.0</td>
<td>40.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

It was clear from the table 4.12 that male principals were more 6(60%) compared to 4(40%) of the females.

4.7.2 Academic qualification for principals
The principals were asked to indicate their academic qualifications reflected in table 4.19

Table 4.19 Academic qualification for principals.

<table>
<thead>
<tr>
<th>EDUCATION</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEGREE</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

It was clear from the table 4.13 that all the principals 10(100%) had attained the degree level academically.

4.7.3 Professional experience of the principals
The principals were asked to give the period they had held their respective offices and they responded as indicated in table 4.20

Table 4.20 Professional experience of the principals.

<table>
<thead>
<tr>
<th>EXPERIENCE</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td>3</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>5-10</td>
<td>6</td>
<td>60.0</td>
<td>60.0</td>
<td>90.0</td>
</tr>
<tr>
<td>10-20</td>
<td>1</td>
<td>10.0</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Most of the principals had an experience of 5-10 years accounting for 6(60%) while 3(30%) of the principals had an experience of 3 years and 1(10%) of the principals had an experience of 10-20 years.

4.7.4 Principals’ area of specialization

The principals were asked to give their teaching fields and they responded as indicated in table 4.21

Table 4.21 Area of specialization

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid SCIENCES</td>
<td>2</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>ARTS/HUMANITIES</td>
<td>4</td>
<td>40.0</td>
<td>40.0</td>
<td>60.0</td>
</tr>
<tr>
<td>MATHEMATICS</td>
<td>1</td>
<td>10.0</td>
<td>10.0</td>
<td>70.0</td>
</tr>
<tr>
<td>LANGUAGES</td>
<td>3</td>
<td>30.0</td>
<td>30.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

It was clear from table 4.15 majority of the principals were in the arts/humanities field accounting for 4(40%), languages field 3(30%), sciences 2(20%) and only 1(10%) were from the mathematics field.

4.8 Knowledge of 21st Century Skills.

4.8.1 Derived and agreed upon 21st Century Skills

The principals were asked to indicate on the most appropriate skills for students to survive in the changing world context of technological age and global market economy. They gave the following data as on table 4.22
Table 4.22 Appropriate skills for survival in the changing world context.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical thinking</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Creativity/innovation</td>
<td>7</td>
<td>14.9</td>
</tr>
<tr>
<td>Problem solving</td>
<td>8</td>
<td>17.0</td>
</tr>
<tr>
<td>Collaboration/teamwork</td>
<td>5</td>
<td>10.6</td>
</tr>
<tr>
<td>Learning to learn</td>
<td>7</td>
<td>14.9</td>
</tr>
<tr>
<td>Communication</td>
<td>8</td>
<td>17.0</td>
</tr>
<tr>
<td>Computer skills</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 4.6 Graph on principals’ response on the appropriate skills for survival in the changing world context.

The data indicated that most of the skills indicated above were necessary for survival in the changing world. Most principals felt that problem solving 8(17%), communication 8(17%) are the most necessary skills for survival in the changing world context of technological age and
global market economy. It was also clear that creativity/innovation 7(14.7%), learning to learn 7(14.7%), computer skills 6(12.8%), critical thinking 6(12.8%) and collaboration/teamwork 5(10.6%) were necessary skills for survival in the changing world context of technological age and global market economy.

4.8.2 Principals response on the importance of the skills

The principals were asked to give reasons why these skills were necessary. The principals gave the following responses as shown in table 4.23

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>To meet global market demands</td>
<td>8</td>
<td>25.8</td>
</tr>
<tr>
<td>To meet technological demands</td>
<td>7</td>
<td>22.6</td>
</tr>
<tr>
<td>To meet shifting workplace demands</td>
<td>8</td>
<td>25.8</td>
</tr>
<tr>
<td>To enhance advancement in scientific literacy.</td>
<td>3</td>
<td>9.7</td>
</tr>
<tr>
<td>Economic competitiveness</td>
<td>3</td>
<td>9.7</td>
</tr>
<tr>
<td>None of the above</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>6.5</td>
</tr>
</tbody>
</table>
Figure 4.7 Graph on principals’ response on the importance of the 21st century skills.

From table 4.23 it was clear that majority of the principals indicated that the skills were most necessary to meet the global market demands 8(25.8%) and to meet the shifting workplace demands 8(25.8%). To some extent due to technological demands 7(22.6%). Advancement in scientific literacy 3(9.7%) and economic competitiveness 3(9.7%) would be contributing factors to why learners require the skills. Other factors such as entrepreneurship and self dependency were noted to have influence, accounting for 2(6.5%).

4.8.3 Principals response on pedagogic or teaching strategies.

The principals were requested to indicate on pedagogic or teaching strategies that would be desirable for 21st century. The data is summarized in table 4.24
Table 4.24 Desirable pedagogic/teaching strategies

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.20</td>
<td>1.398</td>
</tr>
<tr>
<td>ABILITY TO UNDERSTAND</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>1.90</td>
<td>1.287</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>1.90</td>
<td>1.449</td>
</tr>
<tr>
<td>ABILITY TO ANALYSE</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.60</td>
<td>1.578</td>
</tr>
<tr>
<td>ABILITY OF CLASSIFY</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.70</td>
<td>1.636</td>
</tr>
<tr>
<td>ABILITY TO COMPARE</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.40</td>
<td>1.265</td>
</tr>
<tr>
<td>ABILITY OF COMPILE</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.60</td>
<td>1.350</td>
</tr>
<tr>
<td>ABILITY TO PRESENT</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.20</td>
<td>1.398</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.40</td>
<td>1.350</td>
</tr>
<tr>
<td>METACOGNITION</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>2.50</td>
<td>1.650</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>10</td>
<td></td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.80</td>
<td>1.398</td>
</tr>
</tbody>
</table>

Valid N (listwise) 10

With a scale of 1(strongly agree) to 5(strongly disagree) majority of the principals tend to agree that learners ability to solve problems by applying acquired knowledge in a different way and learners ability to understand (mean 1.90) are the most necessary pedagogic strategy for the 21st century. There were a small difference in participants’ perceptions about; Learners ability to present and defend opinions (mean 2.20), learners ability to recall previously learnt materials (mean 2.20), learners ability to show and explain ideas and action to each other (mean 2.40), learners ability to analyze ideas (mean 2.60), learners ability to classify ideas (mean 2.70), and the knowledge and control learners have over their own thinking and learning activities (mean 2.50). Most of the principals perceived the above pedagogic strategies as being equally necessary for 21st century.

Also most of the principals tend to agree that learner’s ability to compare and contrast ideas (mean 3.40), learners ability to compile information together in a different way by combining elements in a new way (mean 3.60) and learners’ motivation (mean 3.80 ) are not that necessary pedagogic strategies for 21st century. Teachers seem to lean towards what they understand.
4.8.4 Principals response on the kind of assessment/examination useful as tools for effective learning in the 21st century

The principals were asked to indicate on the kind of examinations/assessments that would be useful as tools for effective learning of the 21st century skills. They gave the information shown in table 4.25

Table 4.25 Assessment/Examinations useful for effective learning in the 21st century

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC NATIONAL EXAMS</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.10</td>
<td>.738</td>
<td>.544</td>
</tr>
<tr>
<td>CLASSROOM EXAMS</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.70</td>
<td>.823</td>
<td>.678</td>
</tr>
<tr>
<td>HOMEWORK/ASSIGNMENTS</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.10</td>
<td>.876</td>
<td>.767</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On a scale of 1(yes), 2(not necessary) and 3(yes) homework’s/assignment and public national exams had the highest mean rank (2.10). In contrast classroom examinations had the lowest mean rank (1.70). And therefore most principals perceived classroom assessments as the most effective tools in the learning of the 21st century skills. This reflects an appreciation for assessment for learning.

4.9 Learner assessment practices in regards to 21st century Skills

4.9.1 Principals response on how often they do expect teachers to examine/assess students in class

In order to gather information on when principals expect teachers to examine/assess students in class the principals were asked to indicate how often they expect teachers to examine/assess students in a classroom setting. The data is summarized as shown in table 4.26
Table 4.26 Principals response on expected frequency of assessment

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>8</td>
<td>22.2</td>
</tr>
<tr>
<td>Fortnightly</td>
<td>7</td>
<td>19.4</td>
</tr>
<tr>
<td>Monthly</td>
<td>6</td>
<td>16.7</td>
</tr>
<tr>
<td>Half-termly</td>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td>Termly</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>On continuous basis</td>
<td>9</td>
<td>25.0</td>
</tr>
<tr>
<td>As need arises</td>
<td>2</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Figure 4.8 Graph of principals’ response on the expected frequency of assessment.

It was clear that majority of the principals expect the teachers to assess the students within the classroom on continuous basis 9(25%). 8(22.2%) expect the teachers to carry out classroom assessments on daily basis, 7(19.4%) fortnightly, 6(16.7%) monthly. Minority of the principals do expect the teachers to carry out the classroom assessment half-termly 3(8.3%), termly 1(2.8%) and 2 (5.6%) when need arises.
4.9.2 Principals’ response on assessment of concepts in classroom setting to effectively help students learn the 21st century skills

The principals were expected to tick whether the following concepts would be tested within a classroom setting. Table 4.27 below summarizes the information gathered.

Table 4.27 Assessment of concepts in classroom setting to effectively help students learn the 21st century skills.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.70</td>
<td>.823</td>
<td>.678</td>
</tr>
<tr>
<td>ABILITY TO UNDERSTAND</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.70</td>
<td>.823</td>
<td>.678</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.90</td>
<td>.876</td>
<td>.767</td>
</tr>
<tr>
<td>ABILITY TO ANALYSE</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.80</td>
<td>.919</td>
<td>.844</td>
</tr>
<tr>
<td>ABILITY TO CLASSIFY</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.90</td>
<td>.876</td>
<td>.767</td>
</tr>
<tr>
<td>ABILITY TO COMPARE</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.10</td>
<td>.738</td>
<td>.544</td>
</tr>
<tr>
<td>ABILITY TO COMPILE</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.00</td>
<td>.816</td>
<td>.667</td>
</tr>
<tr>
<td>ABILITY TO PRESENT</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.20</td>
<td>.632</td>
<td>.400</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.00</td>
<td>.816</td>
<td>.667</td>
</tr>
<tr>
<td>META COGNITION</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.20</td>
<td>.632</td>
<td>.400</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.10</td>
<td>.568</td>
<td>.322</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There were no significant differences in participants’ perceptions on the testing of the following concepts within a classroom setting in order to effectively help students learn the 21st century skills. On scale of 1(yes), 2 (no) and 3(not necessary) learner ability to recall and learners ability to understand had the lowest mean (1.70), learners ability to present (mean 2.20) and metacognition (2.20) had the highest mean. And therefore most of the principals perceived the learners ability to recall and to understand as the most testable concept in order to help them learn the 21st century skills.
4.9.3 Principals’ response on assessment of concepts in the classroom

Principals were requested to give information on whether teachers do assess the following concepts within the classroom setting during the teaching learning process. The principals’ response was as summarized in the table 4.28

**Table 4.28 Assessment of concepts in the classroom.**

<table>
<thead>
<tr>
<th>Concept</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
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<td>1</td>
<td>3</td>
<td>1.40</td>
<td>.699</td>
<td>.489</td>
</tr>
<tr>
<td>ABILITY TO UNDERSTAND</td>
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<td>1</td>
<td>4</td>
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<td>1.054</td>
<td>1.111</td>
</tr>
<tr>
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<td>1</td>
<td>5</td>
<td>2.30</td>
<td>1.418</td>
<td>2.011</td>
</tr>
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<td>4</td>
<td>1</td>
<td>5</td>
<td>2.60</td>
<td>1.430</td>
<td>2.044</td>
</tr>
<tr>
<td>ABILITY TO CLASSIFY</td>
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<td>4</td>
<td>1</td>
<td>5</td>
<td>2.40</td>
<td>1.506</td>
<td>2.267</td>
</tr>
<tr>
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<td>1</td>
<td>4</td>
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<td>1.269</td>
<td>1.611</td>
</tr>
<tr>
<td>ABILITY TO COMPARE</td>
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<td>4</td>
<td>1</td>
<td>5</td>
<td>2.60</td>
<td>1.174</td>
<td>1.378</td>
</tr>
<tr>
<td>ABILITY TO PRESENT</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.30</td>
<td>1.337</td>
<td>1.789</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.00</td>
<td>1.414</td>
<td>2.000</td>
</tr>
<tr>
<td>META COGNITION</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.00</td>
<td>1.414</td>
<td>2.000</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.30</td>
<td>1.337</td>
<td>1.789</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On a scale of 1(yes), 2(no), 3(not always), 4(willing but not possible) and 5(willing but not required). It was clear that majority of the principals do expect teachers to assess learner’s ability to recall previously learned material (mean 1.40). It was also clear that principals rarely expect teachers assess learners’ motivation and learners ability to present. (Mean 3.30). They do find it not possible to assess or not required in their daily assessment practices. Assessment was still on low levels of learning.

4.9.4 Principals’ response on the assessment strategies that teachers use while teaching.

Principals were asked to indicate on the assessment strategies that teachers use when they do assess the students in the following learning processes while teaching. The information collected is summarized in table 4.29.
Table 4.29 Principals response on how teachers assess the following learning process while teaching.

<table>
<thead>
<tr>
<th></th>
<th>ORAL TEST</th>
<th>PROJECTS</th>
<th>ESSAY</th>
<th>GIVING POINT OF VIEW</th>
<th>MULTIPLE CHOICE</th>
<th>FILL IN BLANK</th>
<th>GROUP WORK</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>22</td>
<td>27.27</td>
<td>0.00</td>
<td>18.18</td>
<td>22.73</td>
<td>18.18</td>
<td>13.64</td>
<td>9.09</td>
</tr>
<tr>
<td>ABILITY TO UNDERSTAND</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>23</td>
<td>17.39</td>
<td>0.00</td>
<td>21.74</td>
<td>30.43</td>
<td>21.74</td>
<td>8.70</td>
<td>0.00</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>3</td>
<td>0</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>22</td>
<td>13.64</td>
<td>0.00</td>
<td>31.82</td>
<td>27.27</td>
<td>4.55</td>
<td>22.73</td>
<td>0.00</td>
</tr>
<tr>
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<td>4</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>17</td>
<td>23.53</td>
<td>0.00</td>
<td>35.29</td>
<td>23.53</td>
<td>5.88</td>
<td>11.76</td>
<td>0.00</td>
</tr>
<tr>
<td>ABILITY TO CLASSIFY</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<td>25.00</td>
<td>8.33</td>
<td>8.33</td>
<td>8.33</td>
<td>0.00</td>
</tr>
<tr>
<td>ABILITY TO COMPARE</td>
<td>8</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>17</td>
<td>47.06</td>
<td>0.00</td>
<td>35.29</td>
<td>11.76</td>
<td>0.00</td>
<td>5.88</td>
<td>0.00</td>
</tr>
<tr>
<td>ABILITY TO COMPIL</td>
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<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>1</td>
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<td>0.00</td>
<td>50.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>ABILITY TO PRESENT</td>
<td>6</td>
<td>0</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
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<td>37.50</td>
<td>0.00</td>
<td>31.25</td>
<td>18.75</td>
<td>0.00</td>
<td>12.50</td>
<td>0.00</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
<td>6</td>
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<td>1</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>15</td>
<td>40.00</td>
<td>0.00</td>
<td>0.00</td>
<td>46.67</td>
<td>0.00</td>
<td>6.67</td>
<td>0.00</td>
</tr>
<tr>
<td>METACOGNITION</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>8</td>
<td>37.50</td>
<td>0.00</td>
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<td>37.50</td>
<td>0.00</td>
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<td>3</td>
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<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>7</td>
<td>42.86</td>
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<td>28.57</td>
<td>14.29</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
As summarized in table 4.29 it was clear that teachers mostly do assess learner’s ability to recall previously learned material and to demonstrate understanding of facts and ideas by the learners giving their own point of view 6 (25%) although a large proportion of teachers also use oral tests 5(20.8%) and multiple choices 5(20.8%) while teaching. Most teachers also use oral test 4(28.6%) and easy test 4(28.6%) in order to assess learners’ ability to solve problems by applying acquired knowledge in a different way, to analyze, classify, compare and contrast ideas and to compile information together in a different way by combining elements in a new way while teaching. In assessment of learners’ ability to present and defend opinions, to show and explain ideas and action to each other, majority of the teachers who do assess the students in the following learning process use oral tests 6(40%). Although most teachers do not assess the knowledge and control students have over their own thinking and learning activities and learners motivation those who do assess the learning process mostly use oral tests 3(37.5%),3(42.9%) respectively. From the data it was clear from the principals that teachers rarely use projects and group work as assessment strategies in classroom in order to assess students in the following learning processes.

4.9.5 Principals’ response on assessment of learning processes by teachers during mid-term and end-term assessments.

Principals were asked to indicate on how teachers do assess the students in the following learning processes in their midterm and end of term assessments. Principals were expected to tick on the various classroom assessment strategies teachers use to assess students on the following learning processes in their midterm and end of term assessments. The information collected was summarized in table 4.30 and table 4.31.
Table 4.30 Principals Response on how teachers assess the following learning process in their midterm assessments.

<table>
<thead>
<tr>
<th></th>
<th>ORAL TEST</th>
<th>PROJECTS</th>
<th>ESSAY</th>
<th>GIVING POINT OF VIEW</th>
<th>MULTIPLE CHOICE</th>
<th>FILL IN BLANK</th>
<th>GROUP WORK</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABILITY TO RECALL</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>26.32%</td>
<td>21.05%</td>
<td>15.79%</td>
<td>36.84%</td>
<td>0.00%</td>
<td>100</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>38.89%</td>
<td>16.67%</td>
<td>11.11%</td>
<td>33.33%</td>
<td>0.00%</td>
<td>100</td>
</tr>
<tr>
<td>ABILITY TO APPLY</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>6</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>31.82%</td>
<td>27.27%</td>
<td>4.55%</td>
<td>36.36%</td>
<td>0.00%</td>
<td>100</td>
</tr>
<tr>
<td>ABILITY TO ANALYZE</td>
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<td>0</td>
<td>8</td>
<td>4</td>
<td>0</td>
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<td>0</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>61.54%</td>
<td>30.77%</td>
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<td>7.69%</td>
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<tr>
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<td>3</td>
<td>3</td>
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<td>0</td>
<td>8</td>
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<td>37.50%</td>
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<tr>
<td>ABILITY TO COMPARE</td>
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<td>0</td>
<td>7</td>
<td>4</td>
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<td>1</td>
<td>0</td>
<td>14</td>
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<td>0.00%</td>
<td>0.00%</td>
<td>50.00%</td>
<td>28.57%</td>
<td>0.00%</td>
<td>7.14%</td>
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<tr>
<td>ABILITY TO COMPILE</td>
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<td>60.00%</td>
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</tr>
<tr>
<td>ABILITY TO PRESENT</td>
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<td>0</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>4</td>
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<td>42.86%</td>
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<td>0.00%</td>
<td>28.57%</td>
<td>0.00%</td>
<td>100.00</td>
</tr>
<tr>
<td>ABILITY TO EXPLAIN</td>
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<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>100.00</td>
</tr>
<tr>
<td>METACOGNITION</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>57.14%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>14.29%</td>
<td>0.00%</td>
<td>100.00</td>
</tr>
<tr>
<td>MOTIVATION</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>40.00%</td>
<td>20.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 4.31 Principals’ Response on how teachers assess the following learning process in their end-term assessments.

<table>
<thead>
<tr>
<th>Ability to Assess</th>
<th>Oral Test (0)</th>
<th>Projects (0)</th>
<th>Essay (5)</th>
<th>Giving Point of View (1)</th>
<th>Multiple Choice (2)</th>
<th>Fill in Blank (8)</th>
<th>Group Work (18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall</td>
<td>0.00%</td>
<td>0.00%</td>
<td>27.78%</td>
<td>16.67%</td>
<td>11.11%</td>
<td>44.44%</td>
<td>5.56%</td>
</tr>
<tr>
<td>Understand</td>
<td>0.00%</td>
<td>0.00%</td>
<td>35.29%</td>
<td>11.76%</td>
<td>11.76%</td>
<td>41.18%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Apply</td>
<td>0.00%</td>
<td>0.00%</td>
<td>33.33%</td>
<td>22.22%</td>
<td>5.56%</td>
<td>38.89%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Analyze</td>
<td>0.00%</td>
<td>0.00%</td>
<td>69.23%</td>
<td>23.08%</td>
<td>0.00%</td>
<td>7.69%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Classify</td>
<td>0.00%</td>
<td>0.00%</td>
<td>50.00%</td>
<td>25.00%</td>
<td>0.00%</td>
<td>25.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Compare</td>
<td>0.00%</td>
<td>0.00%</td>
<td>43.75%</td>
<td>31.25%</td>
<td>0.00%</td>
<td>6.25%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Compile</td>
<td>11.11%</td>
<td>0.00%</td>
<td>44.44%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Present</td>
<td>0.00%</td>
<td>0.00%</td>
<td>46.15%</td>
<td>30.77%</td>
<td>0.00%</td>
<td>23.08%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Explain</td>
<td>40.00%</td>
<td>0.00%</td>
<td>40.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Metacognition</td>
<td>0.00%</td>
<td>0.00%</td>
<td>33.33%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>16.67%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.00%</td>
<td>0.00%</td>
<td>28.57%</td>
<td>28.57%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

From the analysis of the data collected from the principals it was clear that teachers mostly do assess learner’s ability to recall previously learned material and to demonstrate understanding of
facts and ideas by the learners filling in the blank spaces. Most teachers use essay tests in order to assess learners’ ability to solve problems by applying acquired knowledge in a different way, to analyze, classify, compare and contrast ideas and to compile information together in a different way by combining elements in a new way during the mid and end of term assessments. In assessment of learners’ ability to present and defend opinions, to show and explain ideas and action to each other, majority of the teachers who do assess the students in the following learning process use oral tests. Although most teachers do not assess the knowledge and control students have over their own thinking and learning activities and the learners motivation those who do assess the knowledge and control students have over their own thinking and learning activities mostly use essay tests. For those who do assess learners’ motivation majority use the learners’ point of view. From the data collected from principals it was clear that teachers rarely use projects and group work as assessment strategies in classroom in order to assess students in the following learning processes.

4.10 Teacher competency across suitable 21st Century assessment strategies as assessed by principals
4.10.1 Appropriateness of assessment strategies.

Principals were asked to give information on the assessment strategies that their teachers would wish to apply during the teaching learning process but they do not apply to their daily teaching. The information collected is summarized as in the table 4.32.

<table>
<thead>
<tr>
<th>Processes of learning</th>
<th>Oral test</th>
<th>Projects</th>
<th>Essay test</th>
<th>Giving ones point of View</th>
<th>Multiple choice</th>
<th>Fill in the blank</th>
<th>Group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>10%</td>
<td>30%</td>
<td>10%</td>
<td>10%</td>
<td>20%</td>
<td>0%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Figure 4.9 Graph on principals’ response on assessment strategies that they would wish teachers to apply but they are not applicable to their teaching.

From the data collected from the principals it was evident that teachers rarely use projects as an assessment strategy. Most teachers feel that projects as an assessment strategy would not apply to their teaching learning processes 3(30%).

4.10.2 Competence on assessment strategies.

Principals were asked to give information on the assessment strategies that teachers would wish to apply during the teaching learning process but they do not have the necessary skills to construct the assessment strategies. The information collected was summarized as in table 4.33.

Table 4.33 Principals’ response on assessment strategies that they would use but they are not competent in.

<table>
<thead>
<tr>
<th>Processes of learning</th>
<th>Oral testing</th>
<th>Project work</th>
<th>Essay Testing</th>
<th>To give ones Point of View</th>
<th>Multiple choice</th>
<th>Fill in the blank</th>
<th>Group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>40%</td>
<td>10%</td>
<td>10%</td>
<td>20%</td>
<td>0%</td>
<td>20%</td>
</tr>
</tbody>
</table>
From the data collected from the principals it was evident that teachers rarely use projects as an assessment strategy. Most of the teachers do not have the necessary skills to use projects as an assessment strategy 4(40%).
CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction
This chapter gives the summary of the findings, discussions, conclusions and the recommendations as per responses from the target group. This was in relation to the aspect of classroom-based assessment in enhancing learner’s acquisition of 21st century skills in secondary schools. The chapter also points out the areas the researcher thought would require further research in related fields.

5.2 Discussions
This discussion was presented according to the research variables.

5.2.1 Knowledge and understanding of 21st century concepts and practices.
At the turn of the 21st century, the world has been faced with the need for skills beyond traditional disciplinary skills to meet demands for rapid changes arising from technological advancement, scientific innovation, increased globalization, shifting workforce demands and pressures of economic competitiveness are redefining the broad skill set that students need to be adequately prepared to participate in, and contribute to, in today’s market economy as well as society (Levy & Murnane, 2005). To meet this challenge schools must be transformed in ways that will enable students to acquire the creative thinking, flexible problem solving, collaboration and innovative skills they will need to be successful in work and life (Voogt, 2005). Learning must therefore be transformed and not just changed for education to become relevant for survival in the complex world described. The requirement must be for competencies related to quick thinking, self directed learning, curriculum that comments one to the realities of the community.
This has resulted in a different kind of teacher and learner. This has had effect on content taught, new approaches to pedagogic strategies, learner initiatives and motivation, assessment for learning or classifying learnedness to present academic and performance skills. The study was to investigate whether the agenda for the 21st Century has been embraced and is being practiced among teachers in secondary schools.
From the study teachers seem to be able to relate and respond in a manner that reflects knowledge on 21st century skills. They seem to recognize that critical thinking, creativity/innovation, problem solving, collaboration, learning to learn and communication are the most appropriate skills for students to survive in the changing world context of technological age and global market demand. Teachers are able to link the importance of the 21st century skills to the context of the 21st century. Eg technological demands, shifting work workplace demands, scientific literacy, global market demand and economic competitiveness. However it does not mean they know much about 21st century skills.

Teachers are familiar and seem to apply typical pedagogic strategies of application, recall, classification, explaining, understanding and analysis etc. but they do not seem to be familiar with what most deserves for 21st century skills such that the implication is not transverse towards literacy, using judgment and values leading to the development of personal and practical knowledge.

5.2.2 Types of Tests used to assess learning in the 21st Century perspective towards transformative assessment

In the 21st century assessment tools should provide multiple measures that support triangulation of inferences. They should provide a more complete picture of student skills, components of both cognitive and non cognitive knowledge should be addressed, ideally using complementary assessment modes (Ku, 2009). The assessment tasks should be of sufficient complexity and/or offer sufficient challenge since tasks that are perceived as too easy can diminish students’ engagement because completion of the task does not promote a sense of competence (Lange & Adler, 1997). The assessments should include open-ended and/or ill-structured tasks. According to Turner (1995), “open” tasks allow students to decide what relevant information to use or how to use the information to solve the problem. Assessments should use tasks that establish meaningful and/or authentic, real-world problem contexts. Authentic tasks tend to be more extended, more student-directed or individualized, require integration of multiple skills, and “make deliberate use of real-world social and physical contexts. (Turner,1995). Assessment tasks should strive to make student reasoning and thinking visible.
To effectively assess the 21st century skills assessment tasks should make student thinking and reasoning visible by requiring students to provide evidence or logical arguments in support of judgments, choices, claims, or assertions. (Norris, 1989). The study was to investigate whether teachers have adjusted their assessment tools in order to effectively help learners to acquire the 21st century skills. The study reveals that teachers rely on assessment tools that do not provide a more complete picture of student mastery of skills. The assessment tools do not address learners’ components of both cognitive and non-cognitive knowledge, i.e., oral tests and filling in blanks. The teachers fail to use assessment tasks that are more extended, more student-directed or individualized, that would require integration of multiple skills, and “make deliberate use of real-world social and physical contexts, e.g., projects and group work. This shows that the teachers have not yet readjusted to the appropriate assessment tools to effectively help learners acquire the 21st century skills.

5.2.3 Nature of examinations and their appropriateness to the 21st Century learner performance

Current assessment practices need to reflect changes based on new understandings of learning theories, new curricula that are being developed, new knowledge and skills that are necessary for the 21st Century. In this respect assessment of student achievement is changing as in this fast and ever-changing context, students need not only develop deep understandings of disciplines but also develop the ability to analyze, synthesize and make inferences as well as think critically and problem solve. These changes indicate a shift from decontextualised to authentic, contextualised assessment practices; from using one single measure to using multiple measures to build a student’s learning profile; from assessing low level of competence and understanding to assessing high level skills; from assessing a few to assessing many dimensions of intelligence; from isolated assessment to integrating assessment within the learning and teaching practices; and from teacher-directed assessment to increasing student responsibility in the assessment process. (Segers et al, 2003), Kulieke et al (1990). Assisting students to develop these knowledge, skills, and behaviors and become life-long learners requires changes in the assessment processes at the school and classroom level. (Segers et al, 2003).
The study investigated whether teachers have adjusted their assessment techniques to reflect changes based on new understandings of learning theories, new curricula that are being developed, new knowledge and skills that are necessary for the 21st Century. From the study the teacher’s have not yet readjusted their assessment techniques from decontextualised to authentic, contextualized assessment practices; from using one single measure to using multiple measures; from assessing low level of competence and understanding to assessing high level skills; from assessing a few to assessing many dimensions of intelligence; from isolated assessment to integrating assessment within the learning and teaching practices; and from teacher directed assessment to increasing student responsibility in the assessment process. Therefore the teachers’ assessment practices are not appropriate to the 21st Century learner performance.

5.2.4 Extent to which testing desirable 21st century skills is feasible.

A successful 21st century education should prepare students to be successful, contributing citizens in the context of today’s global society. Success in the 21st century requires students to understand how to learn independently. It is necessary to develop strong critical thinking and interpersonal communication skills, both written and oral, in order to be successful in an increasingly fluid, interconnected, and complex world. And therefore assessment should focus on the development and use of skills such as critical thinking and problem solving, written and oral communication, collaboration, creativity and innovation. 21st century assessment builds upon such past conceptions of learning as “core knowledge in subject areas” and recasts them for today’s world and today’s learners where a global perspective and collaboration are critical skills (McLeod, 2010). Schooling needs to be fundamentally reconfigured to emphasize higher order cognitive processes such as critical thinking, creative problem solving, curiosity, and adaptability.(Keengwe, Onchwari&Wachira, 2008; Kozma, 2003; Zhao, 2009).

The study investigated whether it would be possible to assess the development and use of skills such as critical thinking and problem solving, written and oral communication, collaboration, creativity and innovation.

From the study it was clear that since 21st century requires assessment of all levels of learning but more so transformation of knowledge and both cognitive and non-cognitive knowledge components should be addressed, it is clear that teachers lack both knowledge and skills of the
21st century assessment skills. Therefore testing of the desirable 21st century skills remains a challenge.

5.3 Conclusion
Based on the findings of the study the following conclusions were made. Teachers lack the skills and knowledge to adjust the traditional assessment skills to alternative assessment skills that would address the needs for the 21st century learning. The shift desired is from traditional measurement theory approaches to assessment that embraces critical thinking and awareness. Teachers are yet to adjust as well. The assessment teaching and assessment practices reflect those of traditional education theorists which is not appropriate in the current education thinking that embraces 21st Century thinking.

5.4 Recommendations.
The education system should be reviewed and current thinking integrated across all levels of what pertains to education psychology as a practice and a tool in reforming education

5.5 Suggestions for Further Research.
A similar study can be carried out in other districts for comparison purposes as the research was carried out in Mathira East District. The research was carried out in secondary schools as one the levels of an education system. Similar research can be carried out at the primary and tertiary levels of education. The study focused on public schools other researchers could carry out a similar study in private schools in the district for comparison purposes.
REFERENCES


Kothari, (2004). *Research methodology, Methods and Techniques*. Age Publisher; New Delhi


APPENDICES

APPENDIX 1: INTRODUCTION LETTER
MUNYIRI MUTAITI DAVID,
P.O BOX 635-10101,
KARATINA.
EMAIL: dmutaiti@yahoo.com

RE: REQUEST FOR ASSISTANCE OF FILLING RESEARCH QUESTIONNAIRES
I am a post-graduate student at University of Nairobi undertaking a Masters Degree in M.E.D Measurement and Evaluation. I am carrying out an academic research on classroom-based assessment in enhancing learner’s acquisition of 21st century skills.
The findings of this research would be helpful to the educational leadership and policy makers to redefine the role of classroom assessment in learner performance. The purpose of this letter therefore is to seek your assistance as we conduct the research in your school. The respondents will be 4 teachers from your school. ALL information gathered from them will be treated as confidently as possible.
Thank You in Advance for your Assistance.
Yours Faithfully,

........................................
MUNYIRI MUTAITI DAVID.

APPENDIX 2: QUESTIONNAIRE FOR TEACHERS.

INSTRUCTIONS:

Introduction:
The purpose of this study is to explore learning as practiced and directed by teachers as they carry out their role in educating. You are kindly requested to answer all the questions as honestly as possible. The information you provide will be confidential and will be used only for the purposes of research. Please respond by putting a tick (✓) or as requested, for the information required in each item. You may have to tick more than one (1). Where requested do provide the additional information. Do not write your name on the questionnaire.

21st century Skills:
At the turn of the century, the world was defined for us. Learning must be transformed and not just changed for education to become relevant for survival in the complex world. Technology has also accelerated access to communication and knowledge. The requirement is for competencies related to quick thinking, self-directed learning, curriculum that comments one to the realities of the community. This is the argument for the 21st Century.

SCHOOL CONTEXT
Total Number of Teachers: ( ) M: ( ) F: ( )

SECTION A: DEMOGRAPHIC INFORMATION

1. Please indicate your gender.
   - Male [ ]
   - Female [ ]

2. What is your highest level of education?
   - Diploma [ ]
   - Degree [ ]
   - Others (specify) ..........................................................

3. How long have you been a teacher in secondary school?
   - i) 0-5 Years [ ]
   - ii) 5-10 Years [ ]
   - ii) 10-20 Years [ ]
   - iv) Over 20 Year [ ]

4. What subjects do you teach?
   - Sciences: [ ]
   - Arts/ Humanities: [ ]
   - Mathematics: [ ]
   - Languages: [ ]
SECTION B: PERCEPTION AND UNDERSTANDING OF THE 21ST CENTURY SKILLS.

5. Which skills are most appropriate for our students in order to survive in the changing world context of *Technological age* and *Global market economy*?
   
   a) Critical thinking
   b) Creativity /Innovation
   c) Problem Solving
   d) Collaboration/Teamwork
   e) Learning to learn
   f) Communication
   g) Computer Skills
   h) All of the above
   
   Name one other you think apply

   …………………………………………………………………………………………………………………

6. Why are these skills necessary?
   
   a) To meet global market demands.
   b) To meet technological demands.
   c) To meet shifting workplace skills demands.
   d) To enhance advancement in scientific literacy.
   e) For economic competitiveness
   f) None of the above
   
   Any other ………………………………………………………………………………………………………
7. What is your pedagogic or teaching strategy experience while teaching concerning the following statements focusing on the key concept in italics?

SECTION C: CLASSROOM ASSESSMENT AND 21ST CENTURY SKILLS.

8. How often do you examine/assess your students in class?
   - Daily  
   - Fortnightly  
   - Monthly  
   - Half-termly  
   - Termly  
   - On continuous basis  
   - As need arises  

9. What kind of examinations/assessments would be useful as tools for effective learning in the 21st century?
   - Public National Examinations: Yes [ ] Not Necessarily [ ] No [ ]
   - Classroom Examinations: Yes [ ] Not Necessarily [ ] No [ ]
   - Homework Assignments: Yes [ ] Not Necessarily [ ] No [ ]

10. State whether the given concepts **can be tested** in the classroom to effectively help students learn the 21st century skills?
11. State to your knowledge whether the given concepts can be **tested/assessed** in the classroom.
12. If you do assess your students in the given skills when and what classroom **assessment strategies** do you use to assess the skills?
13. Which **assessment strategies** would you apply but you are not competent in:

<table>
<thead>
<tr>
<th>Processes of learning</th>
<th>Oral testing</th>
<th>Project Work</th>
<th>Essay Testing</th>
<th>To give ones Point of View</th>
<th>Multiple choice</th>
<th>Fill in the blank</th>
<th>Group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick as appropriately</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. Which **assessment strategies** would you apply but is not applicable to the teaching you do?

<table>
<thead>
<tr>
<th>Processes of learning</th>
<th>Oral test</th>
<th>Projects</th>
<th>Essay test</th>
<th>Giving ones Point of View</th>
<th>Multiple choice</th>
<th>Fill in the blank</th>
<th>Group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick as appropriately</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**SECTION D: CHALLENGES IN THE ASSESSMENT OF THE 21ST CENTURY SKILLS.**

15. State whether you do test/assess the given concepts in the classroom.

**RESPONDENTS VIEW:**

In your own opinion what challenges do your encounter in process of teaching and assessment of the following concepts?

a) Learner’s ability to recall previously learned material

b) Learner’s ability to understanding of facts and ideas.

c) Learner’s ability to solve problems by applying acquired knowledge in a different way.

d) Learner’s ability to analyze, classify, compare and contrast ideas.

e) Learner’s ability to compile information together in a different way by combining elements in a new way.
f) Learner’s ability to present and defend opinions.

……………………………………………………………………………………………………………………
……………………………………………………………………………………………………………………

f) Learner’s ability to show and explain ideas and action to each other.

……………………………………………………………………………………………………………………
……………………………………………………………………………………………………………………

h) The knowledge and control students have over their own thinking and learning activities.

……………………………………………………………………………………………………………………

i) Learner’s motivation

……………………………………………………………………………………………………………………
……………………………………………………………………………………………………………………

APPENDIX 3: QUESTIONNAIRE FOR PRINCIPALS

The questionnaires were based on the same content as the teachers’ questionnaires and will therefore not be repeated.