African Digital Schools Initiative (ADSI) - Kenya
Monitoring Evaluation Research and Learning (MERL)

Learning Note #2 2019

Cycle 1: Technology Literacy Lesson Design Review – Kenya

1.0 Background

The Global e-Schools and Communities Initiative (GESCI) has worked since 2005 to provide capacity building, technical and strategic advice to countries seeking to harness the potential of ICTs in order to increase access to and improve the quality and effectiveness of education. GESCI in partnership with the MasterCard Foundation and the Ministries of Education of Kenya, Tanzania and Côtè d'Ivoire embarked on a five-year African Digital Schools Initiative (ADSI) (2016-2020) - a comprehensive multi-country multi-year programme to implement an effective, sustainable and replicable model of digital whole-school development in secondary education that promotes 21Century Skills, learning outcomes and readiness for the knowledge economy workplace.

The ADSI model represents elements that can address policy – coherence needs for ICT integration in teaching and learning inclusive of; a blended learning approach to teacher professional development, whole school involvement, School leadership capacity building, converging technologies of e and m learning, development of open resources, an online repository of materials, digital school awards, accreditation and certification to incentivize ICT integration and progression, policy dialogues to raise awareness and to influence new policy formulation and sharing of good practice.

In Kenya, ADSI covers 80 schools (20 in each of the four counties of Kiambu, Narok, Nyamira and Taita Taveta) and includes 80 secondary school principals, 800 teachers, 80 Boards of Management chairpersons and 80 Parents' Association chairpersons.

1.1 Lesson Design Reviews

One of the key components of the ADSI Teacher Professional Development (TPD) is the development of lesson plans which integrate ICTs and 21st Century skills for their teaching.

The Teacher ICT Competency Framework was customized for Kenyan secondary schools and includes two modules for each of the three cycles – Technology Literacy, Knowledge Creation and Knowledge Deepening. In Cycle 1 Technology Literacy, there are two modules - Module 1 training teachers on developing lesson plans using Active Teaching Learning pedagogy, 21st Century skills, with a focus on student collaboration as well as on using ICT integrated presentations as tool, and Module 2 with a focus on critical thinking in lesson planning using simulation as a strategy for learning.

An important skill strategy is to build the capacity of reviewers to assess the quality of lesson plans including; County Project Coordinators, school support teams, School Based Coordinators and other teachers. The task of a reviewer is to look at the whole set of lesson plan and artifacts and assesses the extent to which different aspects of the modules are addressed or incorporated.

1.2 Methodology

The review process was done school by school with the teachers, SBC and county officials, BOM, etc. The project coordinator in each of the counties in every school provided training for the lesson review design process.

The assessment of these lessons aim to track the following;

- Quality of the lesson plan/design
- Use of technology in the classroom in teaching
- Application of 21st Century skills
- Data was collected by the PCs via survey monkey, google docs and other processes.

1.3 Profile of Lesson Plan Reviews

A total 1,560 lesson design reviews in total were carried out in the Technology Literacy Cycle. For Module 1 , some 788 teacher lesson plans were reviewed and 772 for Module 2. There are howveer marginal variations in the stsatistics in this section due to response rates.

The gender profile of the lesson plan reviewers for Module 1 was 66% males and 34% females. In Module 2 there were 34% female and 66% male.

Table 1: Lesson reviewed per form

Form	Module 1	Module 2	Total
Form 1	272	328	600
Form 2	241	245	486
Form 3	156	158	314
Form 4	109	126	235
Unknown/blank	10	05	15
Total	788	772	1560

Table 2: Lesson reviewed per subjects

Subject	Module 1	Module 2	Total
Chemistry	110	105	215
Physics	82	82	164
Biology	123	119	242
Technology	18	19	37
English	144	150	194
Mathematics	105	114	119
Other	200	179	379
Total	782	763	1545

Table 3: Number of lessons reviewed per county per module

Module	Counties	Kiambu	Narok	Nyamira	Taita Taveta	Total
Module 1	# of Schools	192	185	198	210	785
Module 2	# of Schools	205	176	199	191	771

2.0 Lesson plan review findings

Finding 1: Most of the lessons plans reviewed applied Technology Content Knowledge

Teachers demonstrated an understanding of application of Technology Content Knowledge (TCK) in their lessons. On average, a significant majority of the teacher lesson plans reviewed were rated as either good or excellent in terms of effectively integrated strategies for interactive teaching and learning while addressing curriculum goals. The skills transferred during Module 2, which focused on project based learning, were more effectively reflected in lesson plans reviewed than those of Module 1 where the focus was on active teaching and learning.

Figure 1: Lessons plans achieving objectives of Module 1 and 2
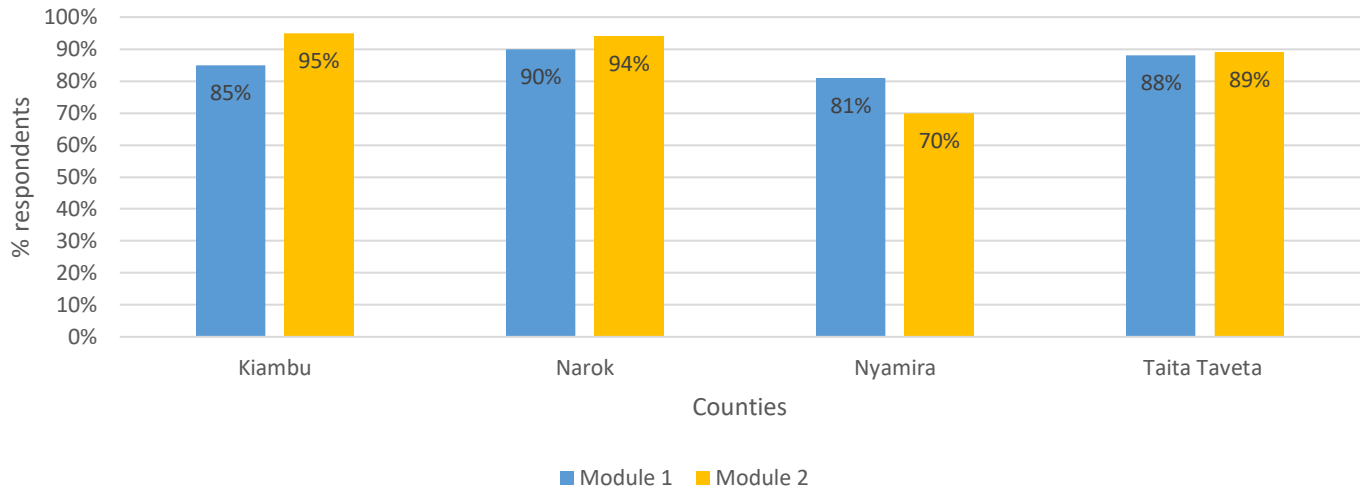
Relative to the other counties, Nyamira teachers struggled to reach the same quality of lesson plans but these may be a reflection of many other external factors in their context.

Finding 2: Most of the lessons plans were able to match pedagogical strategies and technology

The second objective was to check whether the pedagogical strategies were matching with the technologies used. Most teachers demonstrated an understanding of applying TPK in their lessons as most of the lessons were rated highly when it comes to matching technologies to lesson instructional strategies. In both Modules however, Nyamira county had fewer lessons being rated to have matched the required standards.


Figure 2: Lessons matching pedagogical strategies & technologies -TPK
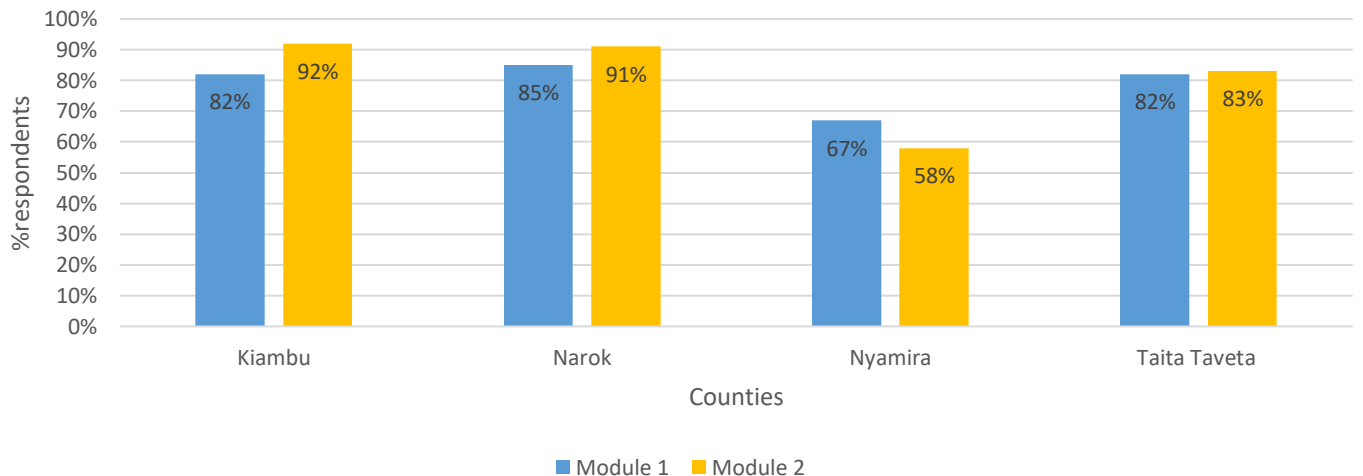
Finding 3: Most of the lessons were able to select and apply the relevant technology

The finding was that in most lesson plans the technology selection(s) matched lesson curriculum objectives and instructional strategies. Again, teachers exhibited high levels of knowledge in integration of technology in their lessons. About 80% of the lessons were rated highly on this aspect in Module 1 and 81% in Module 2.

Figure 3: Figure 3: Lessons with appropriate technology selection (s) - TK
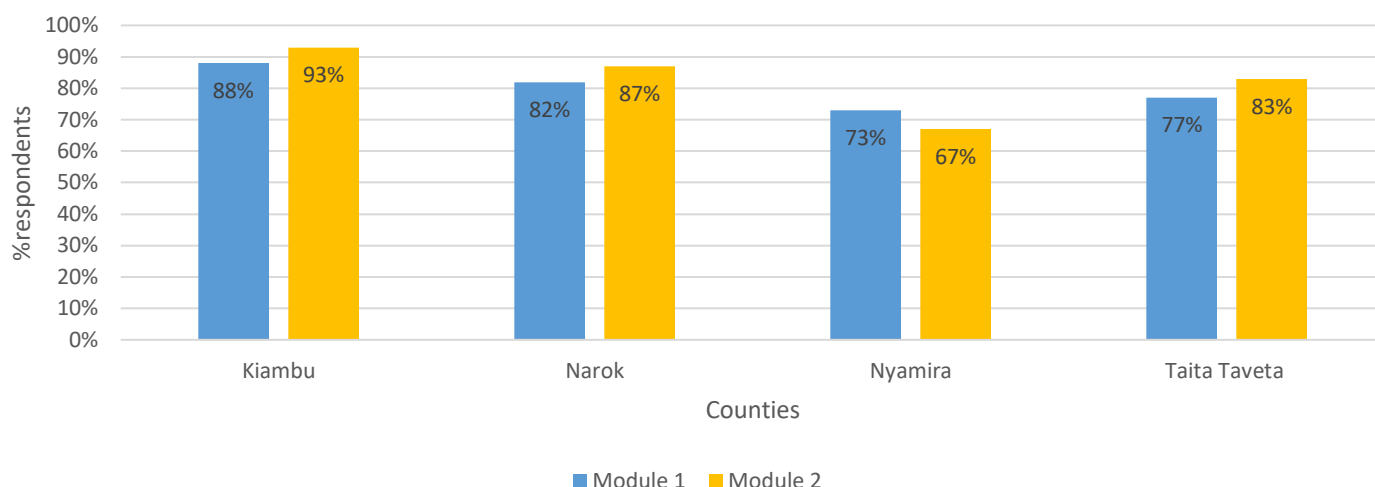
Finding 4: Most lessons are TPACK 'fit'

The review also checked the extent to which the lessons were TPACK "Fit" in general - (Considering curriculum, pedagogy and technology fit all together in the lesson design). Across all the counties except Nyamira, over 70% of the lessons were rated as either good or excellent across Module 1 and 2.
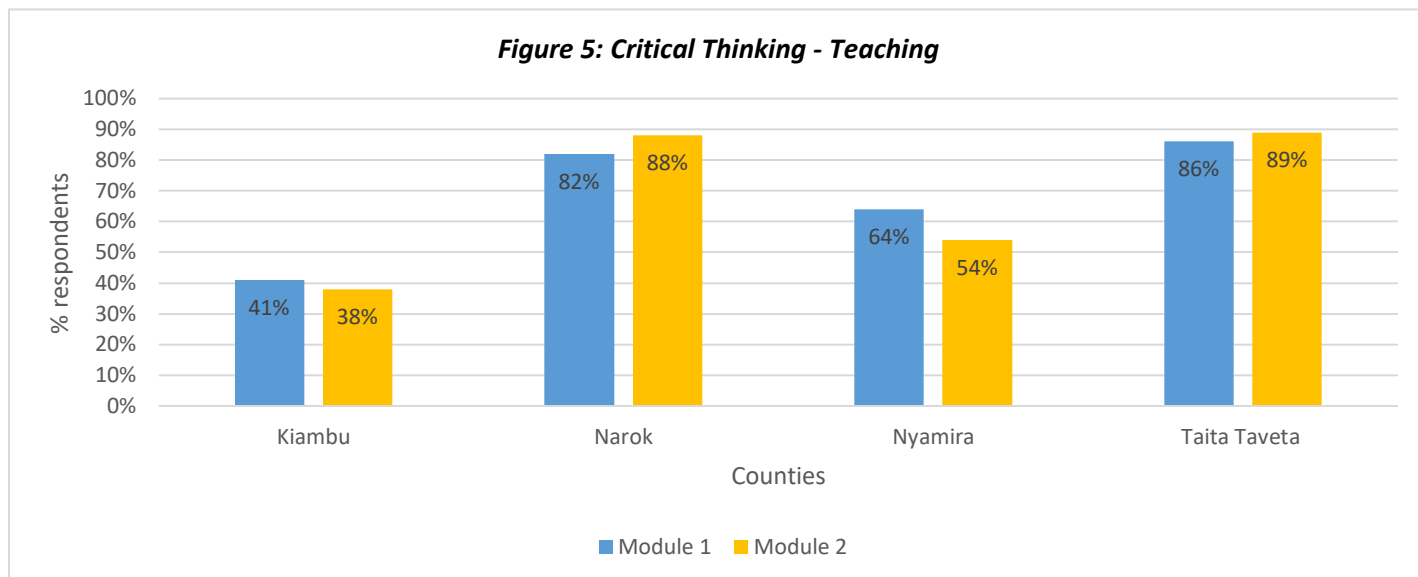
Figure 4: TPACK 'fit' lessons
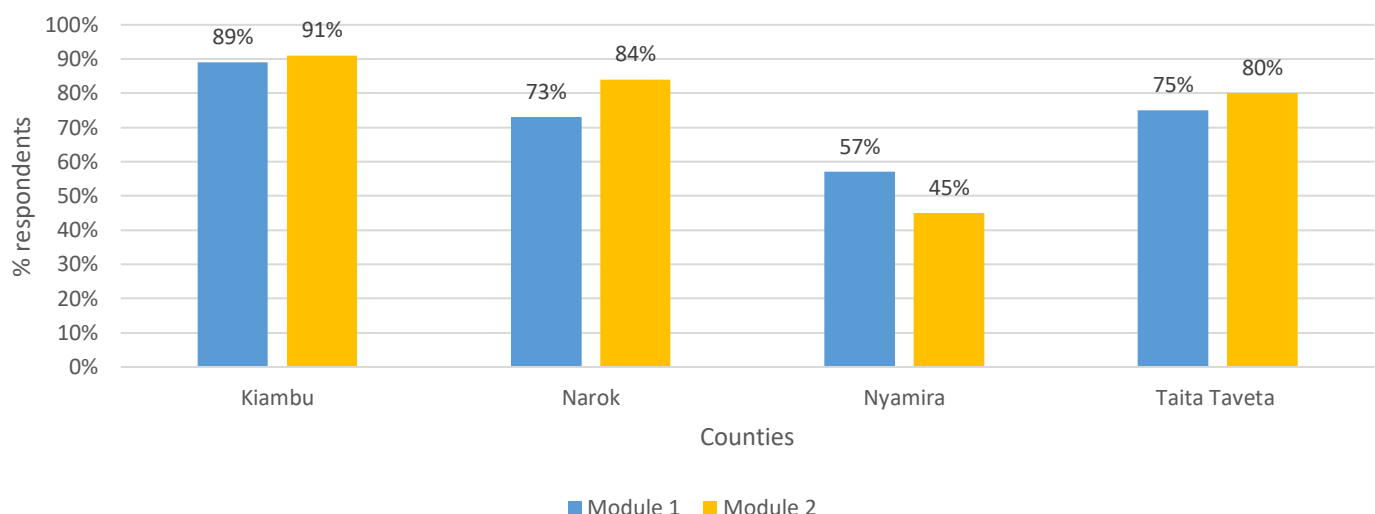
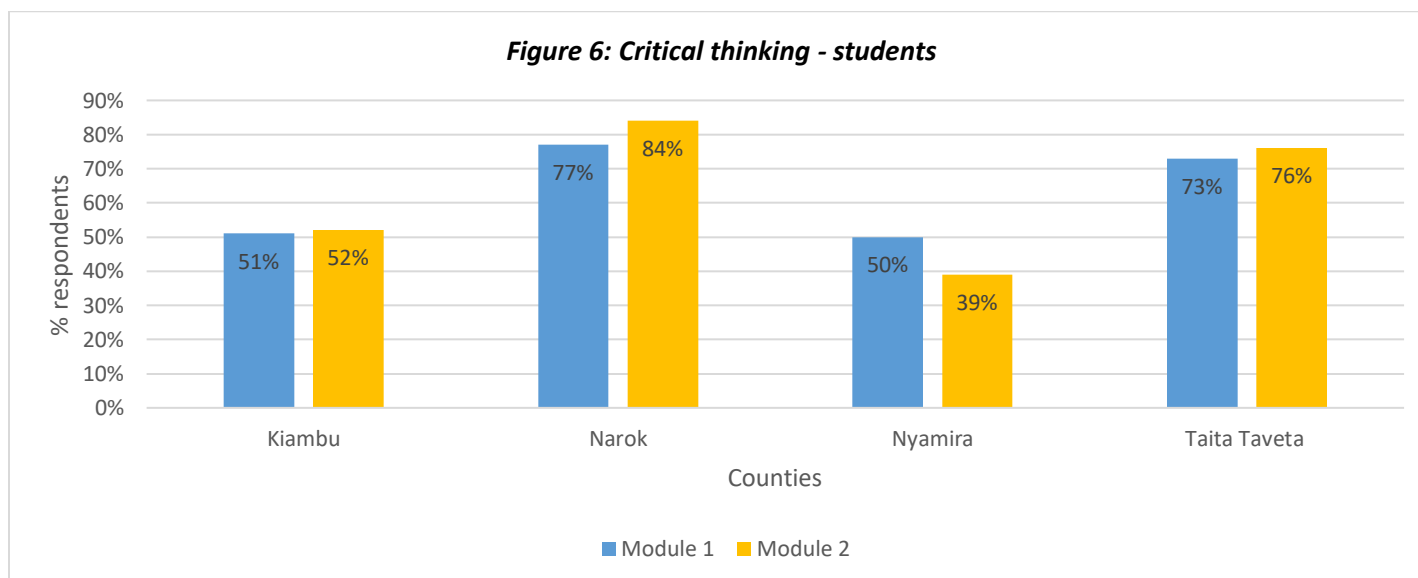## 3.0 21st Century Teaching and Learning Lesson Design

Another main objective was to check whether the lessons were designed to effectively address the 21st Century Teaching and Learning requirements. The 21 Century skills of interest were; critical thinking, collaboration and technology use as a learning tool.

Finding 5: Most of the lesson plans in Narok and Taita Taveta incorporated critical thinking for teachers and students

On critical thinking – teaching, there were varied levels of incorporation across counties. Narok and Taita Taveta recorded the highest number of lessons reviewed at good and excellent levels. Kiambu recorded that less than 50% of the lesson were addressing this skill in both the Modules while Nyamira recorded 64% and 54% of the lessons meeting this objective in Module 1 and 2 respectively.

Figure 5: Critical Thinking - Teaching

Kiambu: Module 1 41%, Module 2 38%
Narok: Module 1 82%, Module 2 88%
Nyamira: Module 1 64%, Module 2 54%
Taita Taveta: Module 1 86%, Module 2 89%

Similarly, teachers also exhibited competence in incorporating critical thinking for the students in their lessons at varied levels across the counties. Narok and Taita Taveta registered higher levels in both Modules compared to the other two counties.

Figure 6: Critical thinking - students

Kiambu: Module 1 51%, Module 2 52%
Narok: Module 1 77%, Module 2 84%
Nyamira: Module 1 50%, Module 2 39%
Taita Taveta: Module 1 73%, Module 2 76%

Finding 6: Most of the lessons in Kiambu incorporated collaboration in teaching and learning

On collaboration in teaching, the levels of incorporation were also varied across the counties with Kiambu leading the other counties. Narok and Taita Taveta followed with almost the same number of lesson being rated highly across the project while Nyamira recorded the lowest incorporation across the two Modules.

Figure 7: Collaboration in teaching
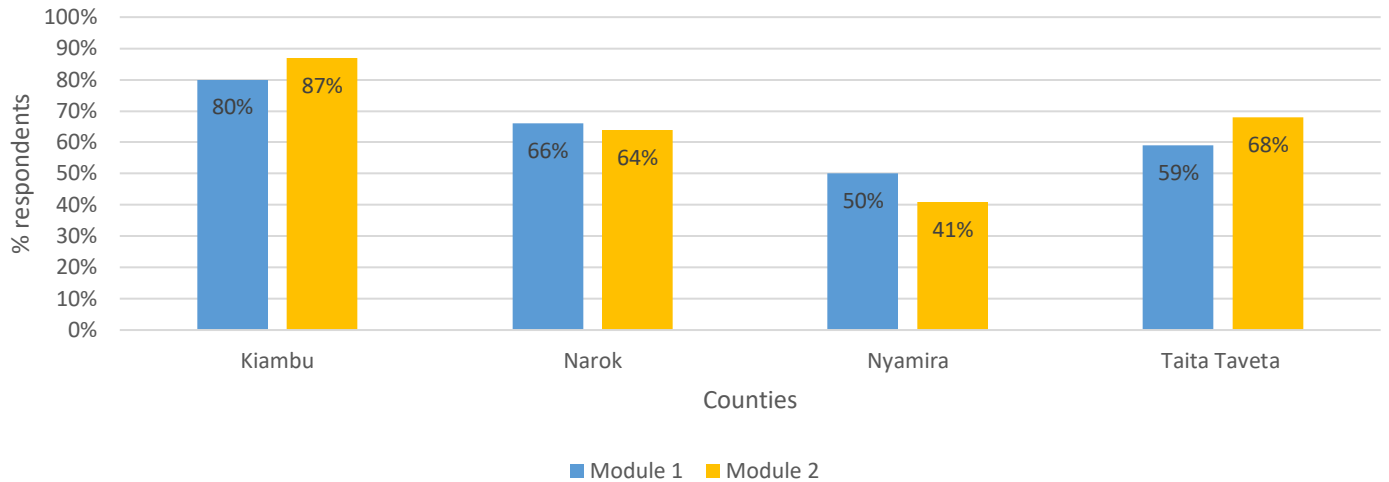
Similarly, Kiambu teachers were the most proficient in ensuring collaboration among students as a learning strategy they achieved the highest number of lessons rated as good or excellent on this aspect. Teachers in ADSI schools in Nyamira struggled with this learning strategy with just about a half of the lessons.
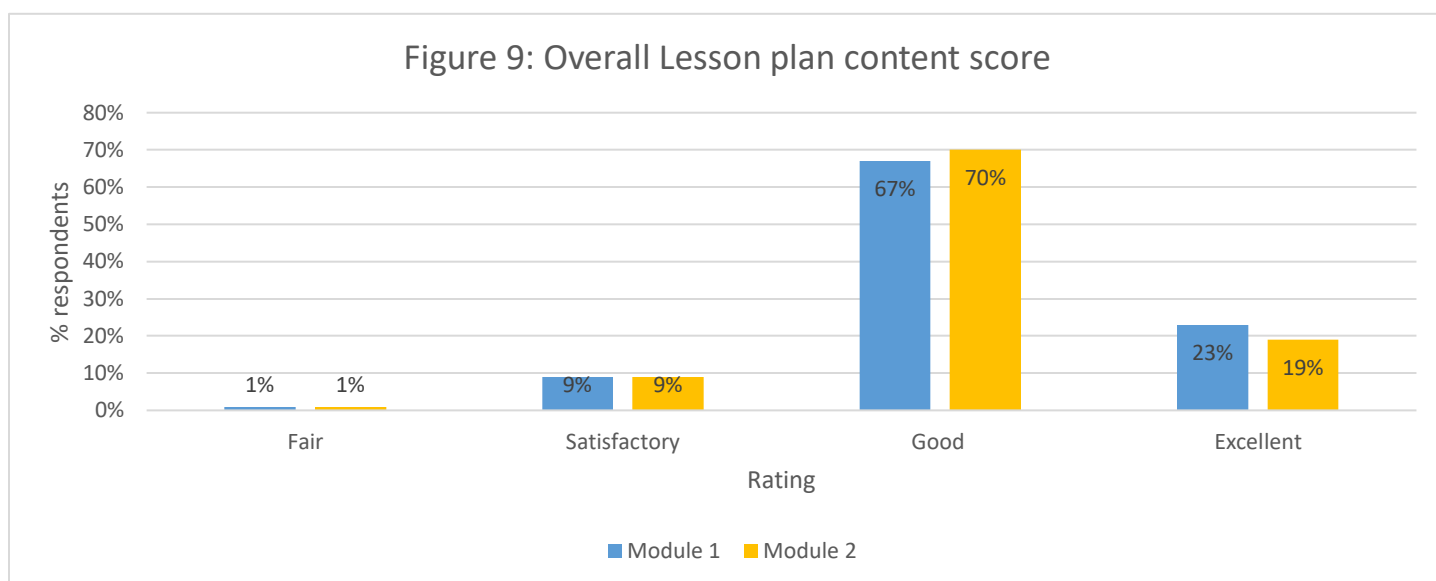

Figure 8: Collaboration in learning
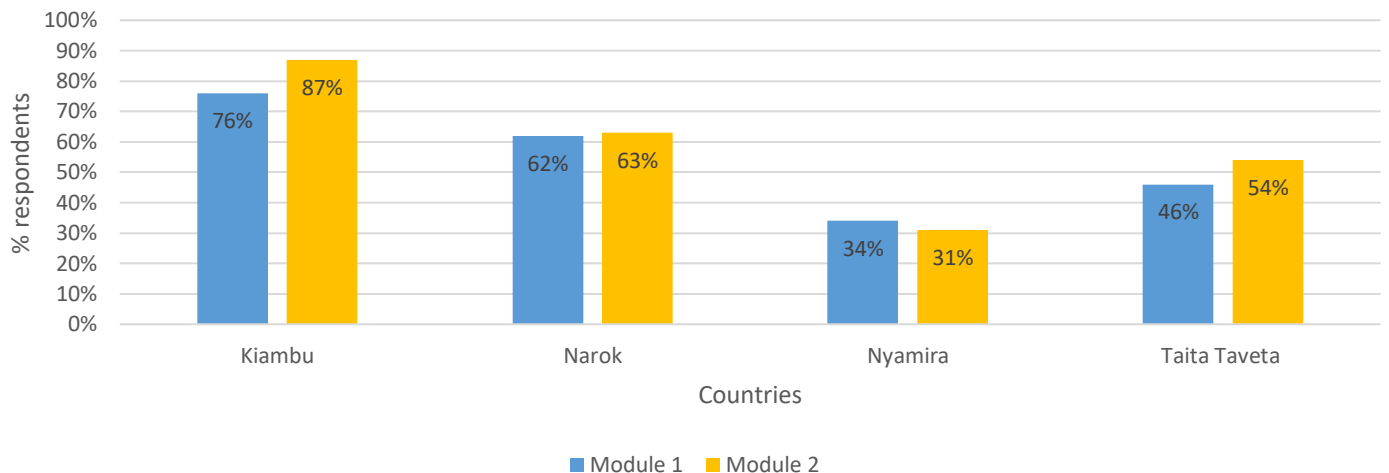
4.0 Overall rating on content, technology, pedagogy and 21st Century skills incorporation

Finding 7: Nearly all lesson plans were very content focused

The lesson plans were reviewed on how appropriately they were focused on content. Generally, 90% of the lesson plans identified the lesson topic with clear curriculum learning objectives across the two Modules.

Figure 9: Overall Lesson plan content score

% respondents vs Rating bar chart:
- Fair: Module 1 = 1%, Module 2 = 1%
- Satisfactory: Module 1 = 9%, Module 2 = 9%
- Good: Module 1 = 67%, Module 2 = 70%
- Excellent: Module 1 = 23%, Module 2 = 19%

Legend: Module 1, Module 2

*"Yes, it has topic/subtopic, lesson objectives, rationale on understanding the law of conservation of mass, mass of products in a chemical reaction must equal mass of reactants." Reviewer, **Taita Taveta***

*"Yes, it has topic/subtopic, lesson objectives, rationale on to be able to explain spreadsheet, its component, create workbook and use of formulae and functions." **Reviewer, Narok***

Finding 8. Teachers effectively integrated the use of technology in their lesson plans

The lesson plans were reviewed on whether or not the lesson plan integrates 'presentation' or 'simulation' or 'open education resources' or 'student worksheet' exercises in word or presentation or spreadsheets to support the curriculum learning objective". On this aspect, over 85% of the lesson plans were rated either as good or excellent across the two Modules.

"Yes, the lesson plan integrates all - Good presentation, simulation that summaries the lesson highlights, OERs to support the lesson and good worksheets that engage students." Reviewer, Taita Taveta

"The teachers have drawn the questions on the students' work sheet from the video watched. This makes learners associate the video with the content learnt." Reviewer, Kiambu

Figure 10: Technology score
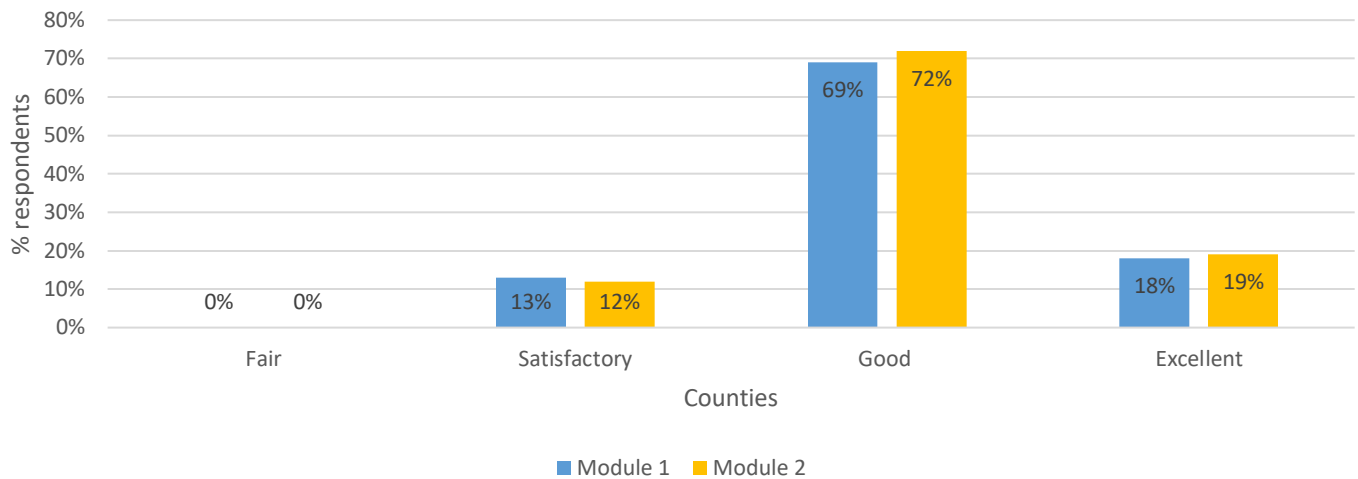
Finding 9: Teacher's lesson plans integrated best practices on interactive on pedagogy

The lesson plans were reviewed as whether or not the lesson plan integrates strategies for 'interactive teaching and learning' or 'questioning' or 'promoting discussion' or 'group work' or 'differentiated learning' to support student learning needs and the curriculum learning objectives. Across the two Modules, over 80% of the lesson were rated as either good or excellent.


Figure 11: Pedagogy score
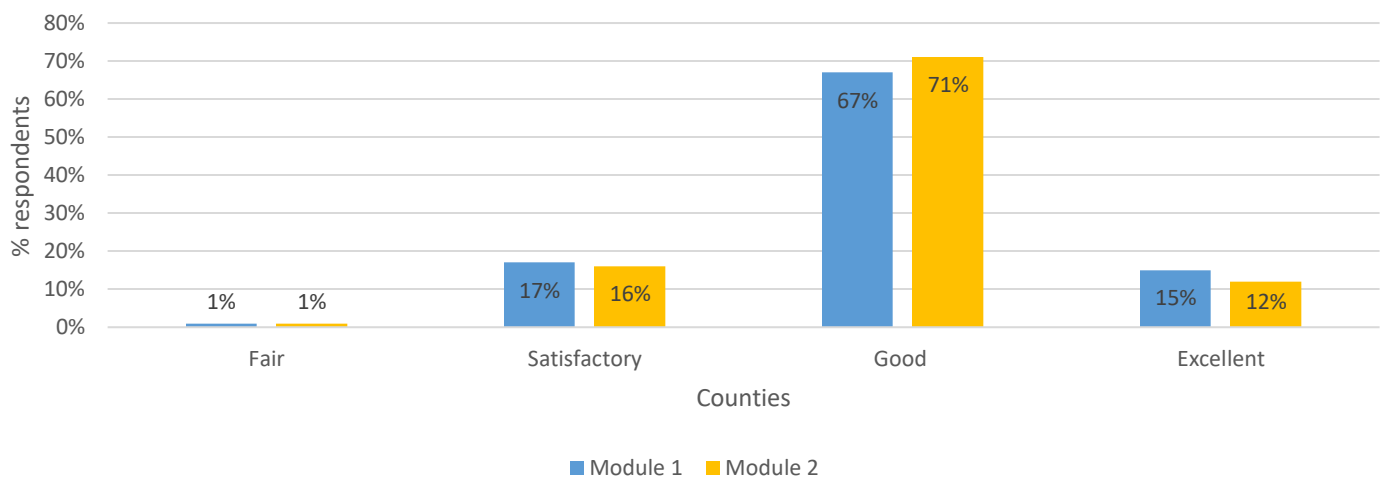
"Through the students' worksheet and the lesson activities, students in groups watch video, manipulate the simulations provided and attempt to answer the questions on the students' worksheet. Well done." Reviewer, Nyamira

"Yes, there is adequate problem solving practices, discussion engagement and students' participation on activities, with collaboration in group work." Reviewer, Kiambu

Finding 10: Most teachers developed lessons incorporated acquisition of the 21s century skills

Lastly, the review looked at the lesson plans on whether or not they supported 21st century teaching and learning strategies of 'critical thinking' or 'collaboration'. Across, the two Modules, about three quarters of the lessons were rated as either good or excellent across both Modules.

Figure 12: 21st Century score
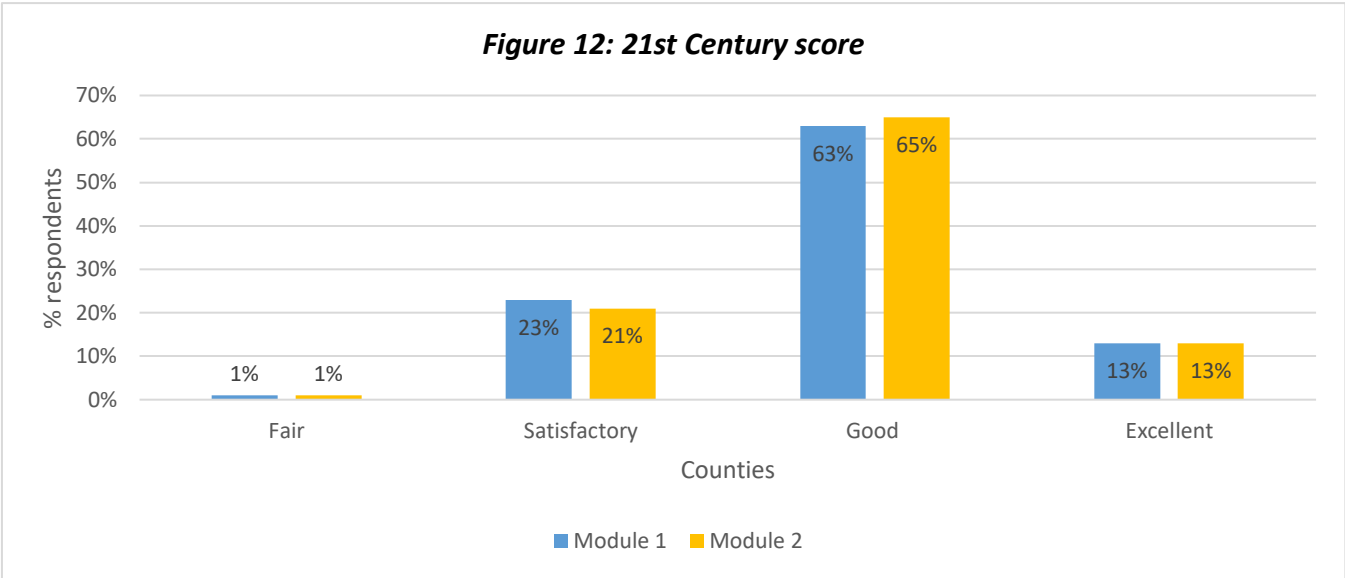
"The students' worksheet has pivotal questions that promote critical thinking and gallery walk for collaboration." Reviewer, Narok

''Yes. Well done teacher. 21st C skills are evident in the lesson plan and in the lesson resources. There is evidence of collaboration. The teacher specifies different groups for different tasks and the students make presentations." Reviewer, Kiambu

Concluding thoughts and learning points

The findings of the lesson review exercises reveal a very positive feedback on the level of implementation of learning. Particularly, the findings proved that teachers had not only acquired the requisite competencies in cycle 1 but that they were able to adequately incorporate the various aspects in their lesson plans. The lesson plans were generally of high quality and had all the important aspects such as use of technology in the classroom, technology knowledge, pedagogy and content. Generally, it appears that there was a positive growth trend with lessons being rated higher in Module Two compared to Module One.

However, despite this largely positive rating, there are a few areas that could be used for learning and reflections;

- **On TPACK:** There were disparities witnessed across the counties with Nyamira generally appearing to be lagging behind. There is need to reflect on whether there were particular factors that contributed to this. In addition, it would also be important to reflect whether there were or there are remedial measures that were taken/could be taken to address this relatively low showing.
- **On 21st century skills:** Critical thinking in teaching appears to have been poorly incorporated in teaching and learning across Kiambu and Nyamira counties. Yet, collaboration in teaching and learning appear to have been very strong in Kiambu but lowest in Taita Taveta and Nyamira. Again, these are disparities that may need to be investigated and checked for learning and corrective action.
- Overall, most teachers address the key issues around content, technology, pedagogy in their lesson plans. The ratings were however much lower on the incorporation of 21st century skills, partly because it was a new concept at the time. It will be important to check the next cycles to see the trend.
- **Survey tool:** In terms of methodology, we missed the opportunity in the review survey tool to identify r the category of the reviewer. Consequently, we are unable to statistically compare how the different categories of reviewers rated the lessons and whether there could have been disparities.

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