



Assessments on portion coverages of prescribed grade nine biology lessons in Abdissa Aga, Senna, Jiren and Mettu Secondary Schools

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Abstract

The objective of the assessment was to investigate the ranges of prescribed of grade nine biology lessons portions coverage and omission in Abdissa Aga, Senna, Jiren and Mettu Secondary Schools found in Oromia Regional National State.

Data collection tool was through questionnaires containing five levelled scored percentile expression categorized as 1)0-24,2)25-49,3) 50-74, 4) 75-84 and 5) 85+% composing of detail lists of all contents of six units of the student textbooks of grade nine biology including sections, lesson topics, activities, review questions, summary and endnotes.

Questionnaires were distributed to 200 students of grade 10 of four Secondary Schools (50 students each) who have attained grade nine and eight grade nine biology teachers who have taught the portions.

In data evaluation methods, the contents of the student textbook were used as variables of assessment of portions coverage and omissions. Collected data were converted into tables containing the five levelled score average of coverage and omission in percentile expression its average results were summarized and demonstrated in graphic forms.

As a result, the grand total average of portion coverage of the prescribed grade nine biology lesson portions was 43.79% against the 56.21% of omission of educational wastages.

Herein, the education wastage overwhelms the portion coverage showing devastation in the quality as well as in the quantity of the education system that includes teaching, learning and assessments.

Unsuccessfulness in completing prescribed portions and omission of more than half the prescribed lesson contents and leaving the last one or two units untouched affects the education systems and academic achievements negatively at all levels including writing the national exams and continuing in the higher education systems.

Keywords: Checklists, Coverage, Lessons, Omission, Portion and Units

Introduction

Teaching Secondary School biology indoctrinates the knowledge of facts with the nature of enquiry and the technique of hypothesis that inbuilt learners the power of observation, judgment and values. It also develops the skills of logical thinking, creativity, reasoning and analysis of mind mapping of students.

Teaching requires understanding the concept of the subject matter and types of effective lesson delivery as theoretical, practice, experiment or various activities with proper supportive materials for equipping each lesson to arrest the attention of learners and attain 100% of the coverage.

Teaching biology uses strategic methods of using the three corners of education systems (teaching, learning and assessments) focussing on successful completion of prescribed portions with confidence. Teaching, learning and assessments are properly managed with the given academic calendar and time budget conducted with classroom conditions.

A prospective teacher of biology should acquire an up-to-date knowledge of the subject matter and proper teaching methods to easily complete prescribed portions timely at the level of students in doable conclusions.

According to Benard Kiprono Bett, Frederick Ngala, B.J.A, Benard Chemwei (2019) teachers should be adequately equipped with new technologies, pedagogical techniques and appropriate instructional resources in order to achieve effective coverage of biology syllabus.

The magnitudes or levels of completions of prescribed lessons in the student textbook are measured by the achievements of students timely demonstrated.

Nevertheless, over sighting or ignorance of any lesson portion affects heavily the opportunity of students in the continuing higher education. The contents of each lesson portion are set to be completed within the academic calendar time range of workload in the annual lesson plan.

Investigating the extents of portions coverage or omission of lessons is the key focus to attest whether the learners of any grade students had learned or left-over the content knowledge.

According to Exyie C. Ryder (1989) cited in (Murray, 1986), a curriculum that provides up-to-date contents, laboratory skills, biological research techniques and combined experiences enable teachers to gain confidence in the ability to do and perform the subject matter.

In view of this, a curriculum must be to the need of the country as well as to the standard that briefs the teacher on how to proceed with contents and completions within the academic calendar of normal schooling time.

The condition of teaching and learning process requires suitable and conducive environments and facilities in addition to the presence of both key elements or teachers and students. Completion of a unit on an average takes three to six weeks if performed without disruptions and discontinuity of the schooling time budget. In spite, overstaying on a unit and ignoring difficult topics are common issues that disrupt or obstacle in finishing portions.

Methods

A census method was used to list contents of each unit of grade nine biology student textbook with sections, lessons, activities, review questions, summary and end notes.

All six unit contents were enumerated in tables for Abdissa Aga (Fiche), Senna (Ghimbi), Jiren (Jima) and Mettu (Mettu) Secondary Schools with a purpose focused on finding the levels of prescribed grade nine biology

portions coverage and omissions. Data collection tools were questionnaires containing five categories of percentile expression levels of scores. Grade nine student textbook contents (units) were used as assessment variables that each unit was set as an **independent** variable and the **levels** of portion coverage or omissions were considered as **dependent** variable. The five level scored categories of questionnaires were employed to enable respondents to determine the levels or the range coverage or omission of the prescribed portions set as: 1) 0-24, 2) 25-49, 3) 50-74, 4) 75- 84 and 5) 85+ (%).

To collect data, questionnaires were distributed to 200 students of grade 10 of four Secondary Schools (50 each) who have already attained grade nine biology and eight grade nine biology teachers have taught the students. The average scores of the maximum and minimum content values determined by the respondents were arranged and listed in tables (1-4) separately as primary data for each unit in four schools.

Accordingly, the average results of portion coverage and omission in each unit of each Secondary School was arranged and listed in tables (5-8) from which the average of prescribed lesson portion coverage and omitted determined as educational wastage was arranged and summarized in table (9).

The average scored values on completion or omissions of prescribed lesson portions of biology grade nine were demonstrated in bar graphs as portion coverage and educational wastage. In order to elaborate the range of **differences** between the levels of coverage and omission in percentile expressions, the bar graphs have illustrated facts of the educational systems for each Secondary School (graphs 1-4).

Table 1 Abdissa Aga grade 9 biology lessons coverage and omission

Unit	Contents	Covered%	Omitted %
One	Biology and Technology	67.81	32.18%
	Renowned Ethiopian biologists	69.3	20.5
	Biological Research in Ethiopia	65.5	20.5
	Activities (1.1 to 1.3) average	70.75	29.25
	Review questions	72.94	29.25
	Summary	66.38	29.25
	End notes	62.00	29.25
Two	Cell Biology	71.16	28.84
	The microscope	70.75	29.25
	The Cell	70.75	29.25
	The cell and its environment	70.75	29.25
	Activities (2.1 to 2.12) average	70.75	29.25
	Review questions	70.75	29.25
	Summary	73.66	26.34
End notes	70.75	29.25	
Three	Human Biology and Health	79.34	20.66
	Food and Nutrition	77.75	22.25
	The digestive system	82.25	17.75
	The respiratory system	77.75	22.25
	The Cellular respiration	76.58	23.42
	The circulatory system	80.88	19.12
	Activities (3.1 to 3.21) average	77.62	22.38
	Review questions	80.88	19.12
	Summary	80.88	19.12
End notes	79.5	20.50	
Four	Microorganisms and Diseases	62	38
	Microorganisms	62	62
	Diseases	62	62
	HIV and AIDS	62	62
	Activities (4.1 to 4.10) average	62	62
	Review questions	62	62
	Summary	62	62
End notes	62	62	

Five	Classification	12	88
	Principles of classification	12	12
	The five kingdoms	12	12
	Activities (5.1 to 5.19) average	12	12
	Review questions	12	12
	Summary	12	12
	End notes	12	12
Six	Environment	0	100
	Ecosystems	0	0
	Food relationships		
	Recycling in nature		
	Adaptations		
	Tree growing project		
	Activities (6.1 to 6.3) average		
	Review questions		
Summary			
End notes			

Table 2 Sena grade 9 biology lessons coverage and omission

Unit	Contents	Covered%	Omitted %
One	Biology and Technology	51.83	48.17
	Renowned Ethiopian biologists	44.50	55.50
	Biological Research in Ethiopia	58.25	41.75
	Activities (1.1 to 1.3)	44.50	55.50
	Review questions	44.50	55.50
	Summary	61.00	39.00
	End notes	58.25	41.75
Two	Cell Biology	62.11	37.89
	The microscope	63.31	36.69
	The Cell	58.25	58.25
	The cell and its environment	60.00	40
	Activities (2.1 to 2.12) average	55.13	44.87
	Review questions	72.30	27.70
	Summary	52.10	47.90
End notes	73.66	26.34	
Three	Human Biology and Health	57.27	42.73
	Food and Nutrition	59.94	40.06
	The digestive system	66.79	33.21
	The respiratory system	51.65	48.35
	The Cellular respiration	72.10	27.90
	The circulatory system	49.00	51.00
	Activities (3.1 to 3.21) average	51.10	48.90
	Review questions	58.83	41.17
Summary	62.56	37.44	
End notes	43.50	56.50	
Four	Microorganisms and Diseases	75.75	24.25
	Microorganisms	77.87	22.13
	Diseases	76.85	23.15
	HIV and AIDS	63.33	36.67
	Activities (4.1 to 4.10) average	64.55	35.45
	Review questions	83.16	16.84
	Summary	85.00	15.00
End notes	79.50	20.50	
Five	Classification	0	100
	Principles of classification		
	The five kingdoms		
	Activities (5.1 to 5.19) average		
	Review questions		
	Summary		
End notes			
Six	Environment	0	100

	Ecosystems Food relationships Recycling in nature Adaptations Tree growing project Activities (6.1 to 6.3) average Review questions Summary End notes		
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Table 3 Jiren grade 9 biology lesson coverage and omission

Unit	Contents	Covered%	Omitted %	
One	Biology and Technology	44.45	55.54	
	Renowned Ethiopian biologists	23.5	76.5	
	Biological Research in Ethiopia	47.25	52.75	
	Activities (1.1 to 1.3) average	20.33	79.67	
	Review questions	46.63	53.37	
	Summary	58.25	41.75	
	End notes	70.75	29.25	
Two	Cell Biology	33.10	66.9	
	The microscope	24.5	75.5	
	The Cell	35.25	64.75	
	The cell and its environment	33.38	66.62	
	Activities (2.1to 2.12) average	16.29	83.71	
	Review questions	42.42	57.58	
	Summary End notes	55.33 24.5	44.67 75.5	
Three	Human Biology and Health	47.30	52.70	
	Food and Nutrition	41.88	58.12	
	The digestive system	38.25	61.75	
	The respiratory system	42.00	58.00	
	The Cellular respiration	53.25	46.75	
	The circulatory system	42.42	57.58	
	Activities (3.1 to 3.21) average	42.27	57.73	
	Review questions	44.00	56.00	
	Summary End notes	60.65 61.00	39.35 39.00	
Four	Microorganisms and Diseases	40.74	59.53	
	Microorganisms	27.75	72.25	
	Diseases	25.21	74.79	
	HIV and AIDS	35.50	64.50	
	Activities (4.1to 4.10) average	17.00	83.00	
	Review questions	45.33	54.67	
	Summary	53.00	47.00	
	End notes	79.50	20.50	
Five	Classification	0	100	
	Principles of classification The five kingdoms Activities (5.1 to 5.19) average Review questions Summary End notes			
	Six	Environment	0	100
		Ecosystems Food relationships Recycling in nature Adaptations Tree growing project Activities (6.1 to 6.3) average Review questions Summary End notes		

Table 4 Mettu grade 9 biology lessons coverage and omission

Unit	Contents	Covered%	Omitted %
One	Biology and Technology	71.36	28.64
	Renowned Ethiopian biologists	73.50	26.50
	Biological Research in Ethiopia	76.65	23.35
	Activities (1.1 to 1.3)	75.50	24.50
	Review questions	70.75	29.25
	Summary	70.75	29.25
	End notes	61.00	39.00
Two	Cell Biology	74.70	25.30
	The microscope	76.50	23.50
	The Cell	70.75	29.25
	The cell and its environment	70.75	29.25
	Activities (2.1 to 2.12) average	64.30	35.70
	Review questions	80.88	19.12
	Summary	77.50	22.50
End notes	82.25	17.75	
Three	Human Biology and Health	58.91	41.10
	Food and Nutrition	63.63	36.37
	The digestive system	70.75	29.25
	The respiratory system	58.85	41.15
	The Cellular respiration	62.00	38.00
	The circulatory system	62.13	37.87
	Activities (3.1 to 3.21) average	62.12	37.88
	Review questions	72.13	27.87
	Summary	77.19	22.81
End notes	73.50	26.50	
Four	Microorganisms and Diseases	62.95	62.95
	Microorganisms	59.94	40.06
	Diseases	65.75	34.25
	HIV and AIDS	58.70	41.30
	Activities (4.1to 4.10) average	75.55	24.45
	Review questions	70.75	29.25
	Summary	64.92	35.08
	End notes	45.00	55.00
Five	Classification	45.12	54.88
	Principles of classification	41.00	59.00
	The five kingdoms	31.90	68.10
	Activities (5.1 to 5.19) average	32.58	67.42
	Review questions	42.88	57.12
	Summary	42.88	57.12
End notes	79.50	20.50	
Six	Environment	33.54	66.46
	Ecosystems	12.00	88.00
	Food relationships	40.75	59.25
	Recycling in nature	30.75	69.25
	Adaptations	32.63	67.37
	Tree growing project	40.75	59.25
	Activities (6.1.to 6.3) average	29.92	70.08
	Review questions	40.75	59.25
	Summary	40.75	59.25
End notes	40.75	59.25	

The outcome demonstrated that in all schools, almost the last two units of grade nine biology lesson portions remained untouched and the total average value of coverage is lagged behind expectations than omitted portions.

The research exposed that the coverage decreased along the slope gradient from unit one to unit four down to the bottom zero in unit six (tables 1 -4) and the levels of the prescribed portions coverage failed below 50% whereby the omitted portions extended to more than 50% jeopardizing the education systems and opportunities of learners

of future careers. The coverages of unit five and six were almost zero (table 2 and 3), most of the prescribe lesson portions were covered in all units (table 4).

Table 5 Abdissa Aga grade 9 biology portions coverage and omission

Units	Contents	Coverage	Wastage
One	Biology and Technology	67.81%	32.18%
Two	Cell Biology	71.16	28.84%
Three	Human Biology and Health	79.34	20.66%
Four	Microorganisms and Diseases	62.00	38%
Five	Classification	12.00	88%
Six	Environment	00.00	100%
	Average	48.62	51.38

Table 6 Ghimbi-Sena grade 9 biology portions coverage and omission

Unit	Contents	Coverage	Wastage
One	Biology and Technology	51.83	48.17%
Two	Cell Biology	62.11	37.89%
Three	Human Biology and Health	57.27	42.73
Four	Microorganisms and Diseases	75.75	24.25
Five	Classification	00.00	100%
Six	Environment	00.00	100%
	Average	41.15	58.85%

Table 7 Jima-Jiren grade 9 biology portions coverage and omission

Unit	Contents	Coverage	wastage
One	Biology and Technology	44.45	55.54%
Two	Cell Biology	33.10	66.9%
Three	Human Biology and Health	47.30	52.70%
Four	Microorganisms and Diseases	40.74	59.53%
Five	Classification	00.00	100%
Six	Environment	00.00	100%
	Average	27.60	72.40%

Table 8 Mettu grade 9 biology portions coverage and omission

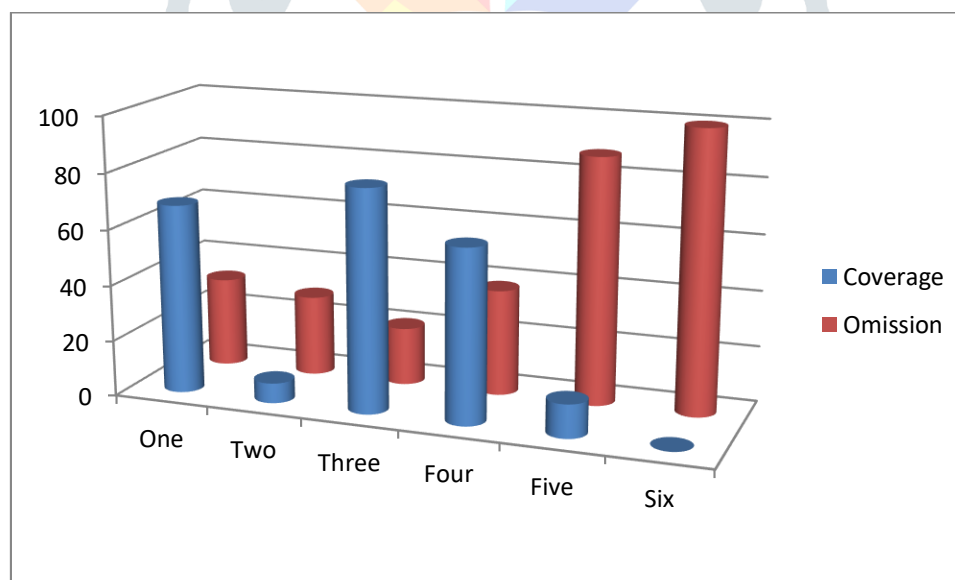
Unit	Contents	Coverage	Wastage
One	Biology and Technology	71.36	28.64
Two	Cell Biology	74.70	25.30
Three	Human Biology and Health	58.91	41.10
Four	Microorganisms and Diseases	62.95	37.05
Five	Classification	45.12	54.88
Six	Environment	33.54	66.46
	Average	57.77	42.23%

Data analysis and evaluation

Data analysis of the study depends on the empirical data collected and demonstrated in bar graphs for each Secondary School.

1. Abdissa Aga Secondary School (Fitcha)

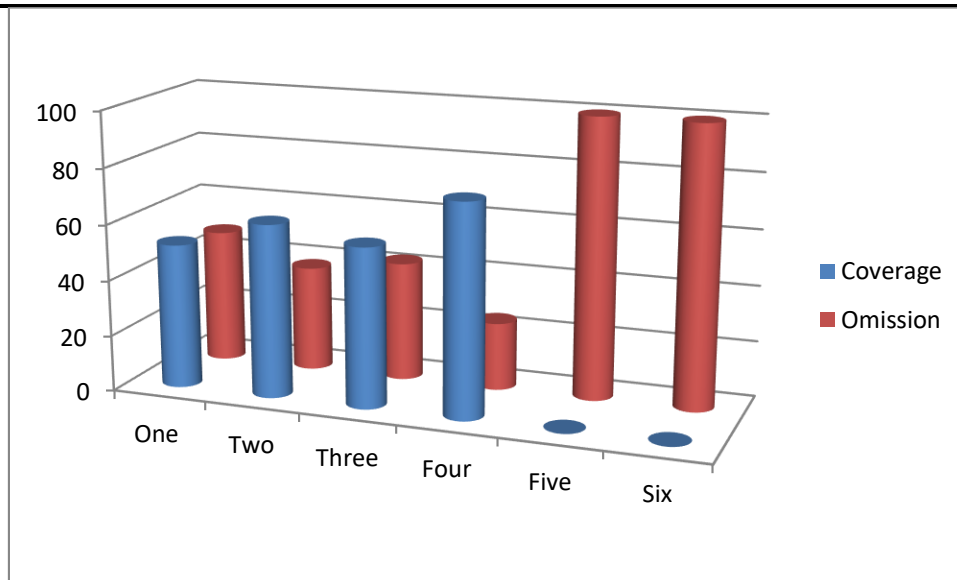
In Abdissa Aga Secondary School, the average prescribed grade 9 biology lesson portions were 48.62% whereby 51.38% of the learning contents were leftover (graph 1). The graph describes that more than 50% of the learning components were wasted which shows the extents of loss of learning contents (wastage), learning time, facilities as well as impacts on parents and future opportunities of students.



Graph 1 Portion covered and omitted

2. Sena Secondary School (Ghimbi)

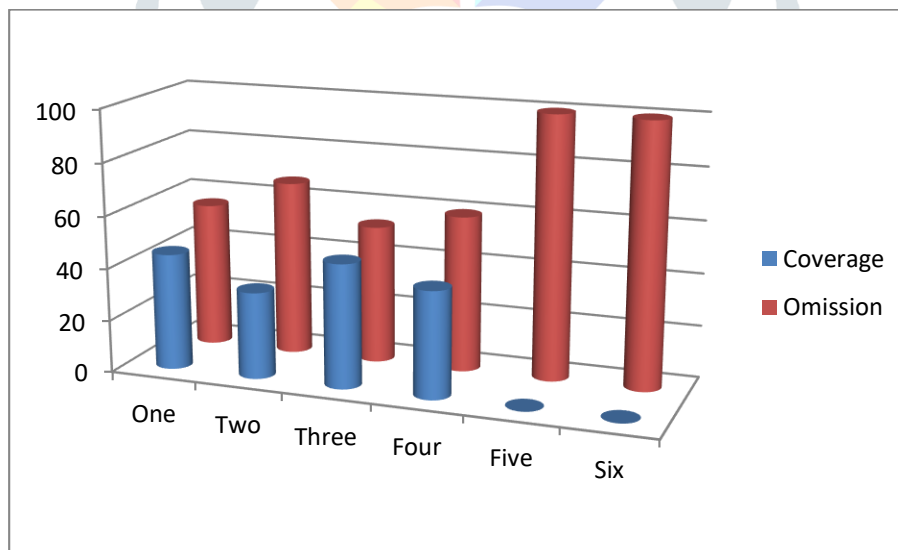
In Sena Secondary School, the average completion of prescribed grade 9 biology lesson portions showed 41.15% against 58.85% of the omission (Graph 2). This graph confirmed that the levels of portion coverage are at about 4% whereby the omission is accounting for about almost 60% of the prescribed contents showing the loss of schooling facilities, resources and time and impacts on the future careers of students.



Graph 2 Portion covered and omitted

3.Jiren Secondary School (Jima)

In Jiren Secondary School, the average portion coverage of the prescribed grade 9 biology lesson portions was **27.60%** against the omitted portions of **72.40%** with untouched last two units (graph 3). The graph clearly demonstrated that the total coverage of the schooling systems failed below 30% and more that 70% of the prescribed portions of the lessons were ignored and wasted that causes its negative education consequences.



Graph 3 Portion covered and omitted

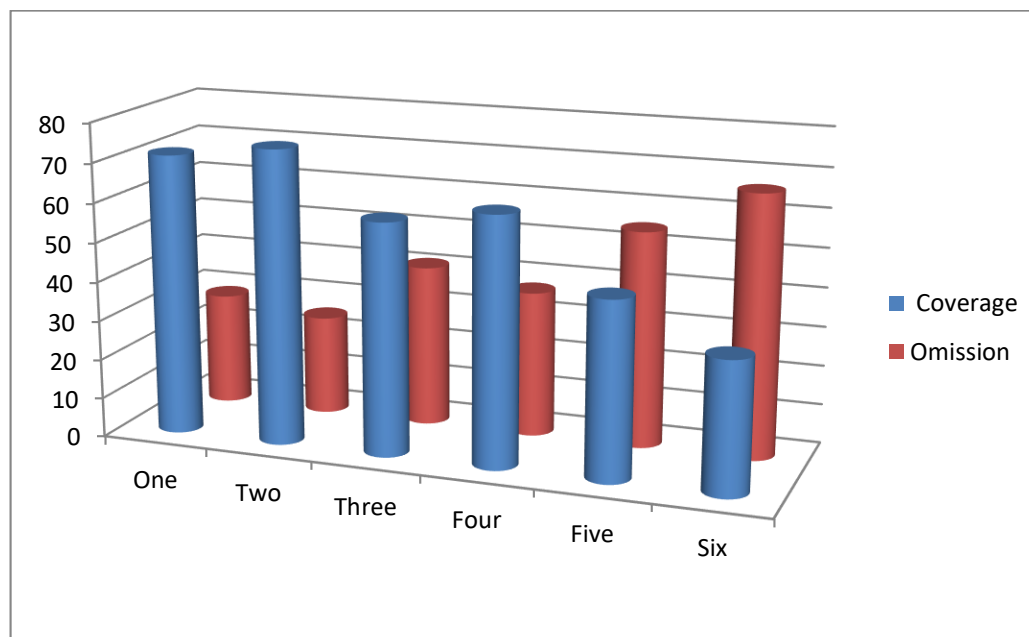
4.Mettu Preparatory School (Mettu)

In Mettu Secondary School, portion coverage of prescribed grade 9 biology lesson portions has accounted for **57.77%** against the omitted portions of **42.23%**, which is relatively better than the rest three secondary schools (Graph 4).

This data indicates that more than half of the contents of the portions covered and the learners have attained almost all of the contents.

The school has effectively conducted the teaching and learning activities to cover all units qualitatively as well as quantitatively to more than 50% and completed with the highest score of all contents subjected to the assessments.

However, it shows the trial of the teachers and the school to solve, overcome educational problems and bridge their students to higher education systems and connect to life, but does not mean the learning was completely successful.



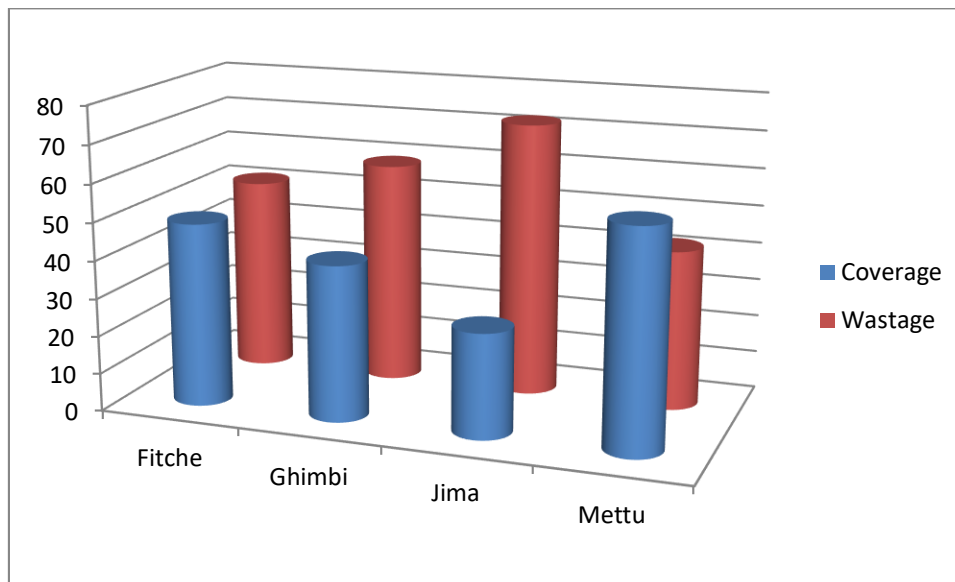
Graph 4 Portion covered and omitted

Correspondingly, the outcome of portions coverage and omissions of all units of the prescribed grade nine biology lessons of all four secondary schools subjected to the study was summarized (table 9).

Table 9 Average coverage and wastage of portions in all schools

Schools	Unit1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Average	All units
Fitche	67.81	71.16	79.34	62.00	12.00	00.00	48.62%	Coverage
	32.19	28.84	20.66	38.00	88.00	100	51.38	Wastage
Ghimbi	51.83	62.11	57.27	75.75	00.00	00.00	41.15%	Coverage
	8.17	37.89	42.73	24.25	100	100	58.85	Wastage
Jima	44.45	33.10	47.30	40.74	00.00	00.00	27.60%	Coverage
	55.55	66.9	52.7	59.26	100	100	72.40%	Wastage
Mettu	71.36	74.70	58.91	62.95	45.12	35.54	57.77%	Coverage
	28.64	28.64	41.09	37.05	58.88	58.88	42.23%	Wastage

In table 9, the average values of portion coverage against omission was arranged and converted into a bar graph (Graph 5).



Graph 5 Educational coverage and wastage in four Schools

The outcome of data analysis of the study shown in graph (5) on portion and omission declared that the wastage of educational values overwhelmed the coverage and made differences in ranking and marking the levels more explicitly. It also revealed the secret of teaching effectiveness or ineffectiveness and exposed failures of the quality of education systems subjected to the study.

Results

The average portion coverage of the prescribed portions of grade nine biology of Abdissa Aga Secondary School was **48.62%** with **51.38%** omission whereas in Sena Secondary School, portion coverage has accounted for **41.15%** against the **58.85%** omission.

In Jiren Secondary School, the portion coverage was **27.60%** against **72.40%** omission whereby in Mettu Secondary school, **57.77%** of the portions were covered and **42.23%** of the portions were omitted.

As a result, the total average portion coverage of the prescribed grade nine biology lesson portions in four Secondary schools was **43.79%** against the **56.21%** omitted as educational wastages.

Conclusion

The assessment on portions coverage and omission of the prescribed grade nine biology lessons was concluded with many fragments of educational wastages.

Educational wastage has accounted for **56.21%** with untouched portions of 33% that could cause difficulties on students in learning and writing national exams as well as in continuing higher educations.

According to Sutuma Edessa (2015), the total average of educational wastage (loss) of both phase-out and phase-in prescribed portion values of grade biology lessons was **60.25%** against the covered **39.75%** of the values. In comparison, this could be noted that a little effort has been done to improve the teaching effectiveness and upgrade the level of coverage of the prescribed curricula. Teachers can effectively accomplish prescribed portions and planned tasks as per the general schooling goals using a variety of teaching techniques.

Educational wastage can occur in the inputs, process and the output while the feedback is the appraisal of the whole process like a canker worm that has eaten deep into the fabric of our educational system (Olantoun Akinsolu A., 2017).

However, portion completion requires successful completion of the prescribed portions in student textbooks using effective techniques of teaching methods and aids by organizing the whole class learning to support individuals using continuous assessment (projects, experiments, tests and exams) for carrying continuous responsibilities.

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