Original Research

Amharic terminologies development efforts in primary education curriculum materials

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Abstract

The study examined term development approach, and term formation methods of Primary Education Amharic Terminologies. It has been conducted using descriptive design of Descretive research. Qualitative data were collected through a questionnaire from textbook writers of grade five and six Civics and Ethical Education, Integrated Science, Mathematics, and Social Studies subjects. Interview data were gathered from curriculum and concerned government institutions experts of Amhara region and federal government. Besides, textbooks of the aforementioned subjects were reviewed to excerpt terms. Then, the qualitative data were analyzed using thematic techniques, and term formation methods; whereas the quantified qualitative data were computed using percentile. The study revealed that textbook writers and curriculum experts were traditionally tend to use primarily puristic approach in order to coin transparent terms. In relation to the efforts made to develop Amharic terms the study indicated that different term formation methods such as derivation, compounding, and blending, abbreviating, terminologization, semantic transfer within a special language, trans-disciplinary borrowing, direct loan, and loan translation can be used in developing Amharic terms. Among these term formation methods the dominant ones is loan translation. Finally, the study suggested that policy based terminology development and cooperation of stakeholder namely linguists, curriculum experts, textbook writers and subject teachers' inorder to have sustainable term cultivation endeavours as well as quality terms.

Introduction

The Ethiopian education and training policy (1994) promotes the use of mother tongue as a medium of instruction (MOI) at primary education level. In this regard, Heugh et al. (2007) and Seidel and Moritz (2009) state that the mother tongue medium schooling promoted by the policy is an important educational system. Besides, research findings show that problems of teaching contents (Spolsky, 2009), students understanding and personality development problems (Seidel & Maritz, 2009; Sure & Ogechi, 2009), as well as educational failure (Pinnock, 2009) are caused by using MOI other than mother tongue or weaker language, especially in primary education.

Therefore, in order to use a language in education, learning and teaching materials like syllabuses, textbooks, teachers' guide, and supplementary reading materials should be produced. In doing so, writing or translating texts of different subjects from the developed languages like English to the local language (Amharic, in this case) is believed to be the primary task of a nation to enhance both access and quality of education.

Terminology development and researches in the field of terminology could have a consequential effect in preparing sound teaching materials. Especially, the preparation of glossaries, and general and special dictionaries can be taken as a prerequisite for quality teaching material production.

Since terminology development mainly focuses on lexical elaboration, it enables researchers to cultivate and adjust a language to the need of the communicative context such as a language of imaginative literature, mass media, education, governance and academic discourses, etc. (Gonzalez, 2002). Likewise, Ferguson (1968) states that term formation is one of the different aspects of language modernization that helps a modern society to form discourses of current realities in different disciplines.

In special language use context, new terminologies can emerge through communication process without conscious efforts of language planning. However, unless such terminologies are managed properly based on research, they can have negative consequences on communication. Concerning this, Fishman (1987, as cited in Antia, 2000) points out that though the investigation of unplanned terminology development is one of the several overlooked or neglected topics in language planning studies, it is an area of fruitful exploration, since it can play an important role in natural language development.

In fact, the role of terminologies is not only to express knowledge but also to create, store, acquire and communicate professional knowledge

(Antia, 2000). This can be achieved through careful development of terminologies. Without having required terminologies, the attempt of raising status of a language or diversifying its function in different domains could be an illusion (Chabata, 2008).

Terminology development accelerates the progress of developing nations like Ethiopia by promoting and implementing mother tongue as a MOI in all fields of learning (Mutasa, 2006). Consequently, the availability of technical terms makes the language capable to use it in education especially for the subjects like mathematics, biology, chemistry and physics that demand several scientific terms. This is because if terms are properly developed, they can facilitate the knowledge transfer process. Therefore, in order to have effective terms, term formation endeavours should be planned and supported by policy.

Terminology policy and terminology planning are two interrelated concepts both of which depend on the language policy of a country. They assist to make a language functional in diverse activities of the language community.

Terminology policy serves as a legal ground to carry out terminological works. Thus, it is defined in the UNESCO's document (2005, p. 4) as follows:

> A national terminology policy is a public strategy formulated at the level of political decision making in a country or in a more or less autonomous language community (within a country or a region that spreads across the borders of two or more countries) with the aim of developing or regulating emerging and existing terminologies for an array of purposes.

Even if terminology policies enable people to regulate the use of terminologies in different domains, several countries in the world do not have terminology policies (Antia, 2008). This could have a negative impact on conducting terminology development activities properly, which is one aspect of the implementation of language planning.

In fact, all languages develop following the economic, political and social growth of their users. This natural development of languages can be strengthened by planning them for more advanced use. This conscious and continuous intervention in language development is a terminology planning. As stated in UNESCO's document (2005, p. 8), "…terminology planning consciously and systematically develops special language according to the needs and requirements of domain communication." In addition to addressing the communicative needs of domain specialists, terminology planning responds to socio-cultural needs of a society by

maintaining their languages (Myking, 1997). It makes their language capable of serving in various domains, so the language continues as an identity marker without any danger of extinction.

Terminology planning is an inevitable task to build a knowledgeable society (Matsuda et al., 2008). In order to make its implementation fruitful, it should point out an appropriate term development approach or methodology that helps to harvest terminologies based on the language situation of the country and terminological researches.

Madiba (2001) has forwarded three approaches that can be used for terminology development. They are Puristic approach, Liberal approach and Pragmatic approach. The Puristic approach tries to develop terminologies from indigenous sources, so it considers borrowing from foreign languages as a last option. This approach is criticized for its focus merely on the language forms rather than the communicative needs of the language users. The Liberal approach depends on borrowing of terminologies from developed foreign languages like English and French. It is criticized for avoiding using of internal resources in terminology development works. The last approach is Pragmatic approach which tries to combine the above two approaches. This approach uses indigenous and foreign resources to develop terminologies. It applies borrowing and nativizaton strategies of terminology elaboration.

Execution of terminology policy and terminology planning requires collective effort. It is teamwork (Felber, 1977). Especially linguists, terminologists, domain experts, terminographers, translators, computer engineers, educators, researchers and others are expected to work together at national and international level (Drame, 2006; Budin, 1992). Moreover, active engagement of the language community is crucial in terminology development process (UNESCO, 2005).

Therefore, since terminologies play an important role in specialized communication, they should be formed in a systematic way. Terms can be single terms or multiword terms with specific morpho-syntactic and morpho-semantic characteristics (UNESCO, 2005). Because of this, the term formation process requires knowledge of these linguistic features.

Term formation method differs from general word formation technique, because it is a conscious undertaking. It enables to form different terminologies; and terms are created knowingly to fill the communication gap. Therefore, the creation of new terms requires knowledge of word formation methods.

Sager (1996, p. 25) defines term formation as follows:

Term formation is the process of naming the concepts required by a particular special language community for the development of cognitive processes and communication. It is a conscious human activity and differs from the arbitrariness of general word formation processes by its greater awareness of pre-existing patterns and models and of its social responsibility for facilitating communication and the transmission of knowledge.

As explained in the above definition, term formation entails knowledge of current lexical items and term formation patterns in the target language. Especially, professionals such as curriculum materials writers, terminologists, translators, technical writers, who work with less developed languages like Amharic, might be forced to form new terminologies to accomplish their tasks. In fact, in these languages there is lack of well-prepared specialized dictionaries and glossaries. Therefore, knowledge of term formation helps the aforementioned experst and other interested governmental and non-governmental institutions to fill in their terminology shortage.

According to ISO 704 (2009) and UNESCO (2005), the formation of terminologies is carried out by three methods, namely, Creating new terms, Using existing forms and translingual borrowing. However, the term formation is expected to respect the norms of the language to be cultivated (Myking, 1997).

The main term formation methods include sub-techniques of term formation (Sager, 1996; ISO, 2009). Under the first method (i.e. creating new terms) techniques such as derivation, compounding, blending and abbreviated forms (like clipped forms, abbreviations, initialisms and acronyms) are included. Under the second method (i.e. using existing forms) sub-term formation techniques like conversion, terminologization, semantic transfer within a special language and transdisciplinary borrowing are included. Moreover, the third term formation method (*translingual borrowing)* incorporates direct loan and loan translation.

The above term formation methods are expected to work in any language, but their applicability should be assessed (UNESCO, 2005). It is less practical to produce an effective guideline that can serve for all languages of the world (Sager, 1990).

Amharic is serving as a MOI starting from 1958/59 in Ethiopia (McNab, 1989). However, its function in professional activities (such as, in teaching of different subjects, researches and academic discourses) has limitation. One of the causes of this deficiency is lack of technical terms (Takkele, 2000; Abera, 2002; Mulugeta, 2008; Mesfin, 2000 E.C.). In fact,

McNab (1989) has indicated that even if much work has been done to develop Amharic so far, still to cope with rapid and dynamic situations terminology development requires a great concern especially in the fields of science, technology, political science and other fields. As David (1990, P. 74) indicates, "Language develops mainly through its purposeful use". Besides, Mutasa (2006) complements that using a language in different domains of life empowers it and builds a positive image.

Most of the reviewed research works (Hailu 1971; Alemayehu, 1970 E. C.; Beede & Abate, 1972 E. C.; Dagnachew & Amsalu, 1974 E. C.; Mulugeta, 1972 E. C.; Amsalu 1980; Assefa, 1984; Polacek, 1987, 1994; Gankin, 1988; Richter, 1988, 1989; Abraham, 1991; Seifu, 1993; Takkele, 2000; Aragaw, 2009) examined about Amharic term formation efforts in different disciplines like science, technology, mathematics, politics, economics, law, linguistics, folklore, art and other fields. Most of the studies focused on investigation of terms excerpted from bilingual dictionaries, Amharic newspapers, textbooks and other sources. Some of the studies (Leslau, 1957; Abraham, 1963, 1968; Bender, 1972) revealed that Amharic borrowed words from Geez, Afan Oromo, English, Italian, Greece, Arabic, French and Portuguese. Among these languages English, Geez and French are found to be the main sources of the loan terms. Generally, in the reviewed studies stated above, superfluous borrowings, the proliferation of different term candidates for a single concept and unsystematic handling of terminological issues are stated as the main problems of Amharic terminology development.

Furthermore, the need of investigating development aspects of PEATs also arose from informal discussions the researcher had with teachers, parents and colleagues about using Amharic to teach Mathematics, Integrated Science, Civics & Ethical Education, and Social Studies subjects in primary education in Bahir dar city. From these discussions, since the terms were highly criticized for being ambiguous and combersom by the users, the researchers have come to understand that terminology related problems may have negative influence on teaching and learning processes.

Therefore, in order to address the above problems, the present study attempted to answer the following basic questions:

1. What type of approach is used to develop Amharic terminologies in primary education curriculum materials, and why is it used?
2. How are Amharic terminologies formed in contemporary primary school teaching materials, and which term formarion method is the dominant one?

Theoretical and Conceptual Frameworks

Since Communicative Theory of Terminology (CTT) takes "terms" simultaneously as units of knowledge, language and communication, it describes terms by giving due account to cognitive, linguistic and socio-communicative components (Cabre, 2003). This shows the multidimensional nature of the theory that helps to understand and describe terminological units in a complete way. Moreover, as Benitez (2009) and Faber and Lopez (2012) witness the CTT is relatively a feasible working theory because it enabled to conduct researches on different issues of terminology such as conceptual relations, terminological variation, term extraction, and application of various linguistic models to terminology.

CTT helps to accommodate the needs of different professions, including the teaching of special subjects like mathematics, sciences, social studies etc., which require representation and transfer of specialized knowledge. Besides, this theory employs a semasiological or term-driven approach, which is relevant for this research since this research primarily focuses on terms rather than concepts. The terms are already in use in primary education academic written discourses or running texts (textbooks). The definitions of the terms are determined by the context of the special discourse in which they appear.

In sum, the CTT is more comprehensive than other proposed theories of terminology because it includes cognitive, linguistic and socio-communicative components when it describes a terminological unit. It also clearly describes the nature of terminological units (Faber & Lopez, 2012). Terminological units transfer or communicate specialized knowledge, for example in relation to this study, from textbook writers/ textbooks/ teachers to students.

Therefore, based on the Cabre's (2003) broad framework of CTT, the following language (linguistic) based conceptual framework (model) is prepared and implemented for the present research.
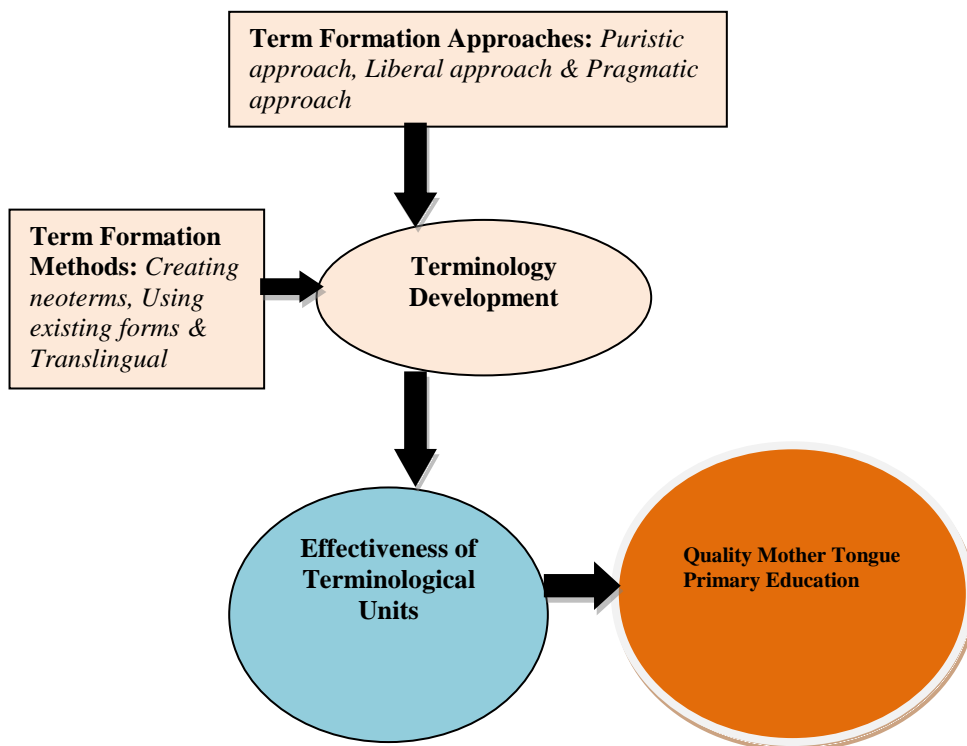
Conceptual Framework of the Study

The above conceptual framework points out two of the variables (i.e., term formation approaches, and term formation methods) that can influence the formation of terminological units as well as their effectiveness in teaching and learning process of mother tongue medium primary education.

Method of the Study

Research design

The main objective of this research was to identify term formation approach and methods implemented to develop primary education Amharic terminologies. In order to accomplish this objective, within a descriptive type of research, the descriptive design was applied. In order to collect necessary data, textbook writers, and curriculum & other experts from relevant institutions participated.

Sampling procedures

Civics & Ethical Education, Mathematics, Integrated Science and Social Studies textbooks of grade five and six were chosen using purposive sampling method. 32 textbooks writers were selected using Comprehensive sampling technique. Besides, purposive sampling method is employed to select 16 experts from relevant government institutions.This research employed document review, questionnaire and semi-structured interview as data collection instruments.

Document review

Document review is used to take excerpts of Amharic terminologies from primary education textbooks of grades five and six Civics & Ethical Education, Mathematics, Integrated Science and Social Studies subjects. The candidate terms were manually detected among content words by the researcher using rating scale approach which is adapted from Chung (2003), and Chung and Nation (2004).

In the pilot study, the inter ratters reliability of the rating scale was tested. The reliability statistic test was made by Coefficient alpha using SPSS 20 version. According to the test, the reliability statistic results of Civics & Ethical Education, Integrated Science, Mathematics and Social Studies subjects' were .948, .982, .975 and .876, respectively. The four subjects' results of the Coefficient alpha statistic are more than .7 at .05 confidence interval, so the rating scale was checked reliable.

The validity of the term excerption methodology, using the rating scale, was checked by searching equivalents for identified Amharic terms from grades five and six Civics and Ethical Education, Mathematics, Integrated science and Social studies syllabuses and textbooks written in English by MoE except Integrated Science textbooks which were prepared by SNNPR Education bureau. Moreover, monolingual dictionaries (i.e., *Addis Yamariñña Mäzïgäbä qalat*, Desta, 1970; and *Amariñña Mäzïgäbä qalat*, Ethiopian Languages Research Centre, 1993 E.C.) and English-Amharic bilingual special dictionary (i.e., *Science and Technology Dictionary: English-Amharic*, Academy of Ethiopian Languages, 1996) were also used.

Questionnaire

A questionnaire was administered to collect data from the textbook writers. This questionnaire is prepared based on the relevant literatures from the fields of language planning and educational psychology and was revised based on the comments given by professionals from the fields of linguistics and education. The questionnaire included 3 open ended questions. Totally, 32 valid questionnaires filled in by textbooks writers were employed in the research.

Interviews

Semi-structured interviews were conducted with curriculum and concerned government institutions experts using two different interview guides. The curriculum experts were from Amhara Region Education Bureau and Minstry of Education (MOE). The remaining experts were from concerned regional (i.e. ANRS Culture, Tourism and Parks Bureau) and national (i.e. Ethiopian Languages and Cultures Academy, Ministry of Culture and Tourism, Ethiopian Standards Agency, and Ministry of Science and Technology) government institutions.

The curriculum experts' and concerned government institutions experts' interview guides included 14 and 11 questions, respectively. The questions focused on the approaches used to form primary education Amharic terms. The interview guides were evaluated by the research supervisors, two psychologists, one linguist and one Amharic language teaching expert. Thus, the interview guides were used for the final study after necessary improvements had been made based on the evaluations made and the lessons learnt from the pilot study.

Semi-structured interviews were conducted with 16 experts. To accomplish this task, 13 sessions of individual interviews, and one session of group interview were conducted. The group interview was conducted with three Integrated Science (Biology, Chemistry and Physics) Amhara Region Education Bureau curriculum experts. After securing the consent of the interviewees, the interviews were recorded using tape recorder. Then, the interview data was transcribed in verbatim and translated into English.

Methods of data analysis

This research employed a qualitative data collection and analyses. Therefore, the qualitative data gathered through questionnaire, interview, and document review were analyzed by using thematic and linguistic analyses methods. The qualitative data obtained through the questionnaire

and interviews were analyzed thematically. On the other hand, linguistic analysis was made on document review data. The investigation of term formation methods was mostly done in line with International Organization for Standardization document ISO 704. As an international standard document for terminology work, it provides guiding principles and methods for term development. The term formation techniques that are explained in this document are applicable in English as well as in other languages (ISO 704, 2009; Valeontis & Mantzari, 2006). Besides, Takkele (2000), Baye (2000 E.C.) and Getahun (1989 E.C.) are also consulted to get a complete picture about Amharic term and word formation methods. Moreover, based on the linguistic form of terms, percentile is used to show to what extent the source language, the target language and the term formation methods were used to develop terms which are excerpted from the textbooks.

Results

Term development approach

The study examined the type of term development approach that is used to develop Amharic terminologies in primary education curriculum materials and the justifications for using it. In order to address this issue, the data collected from concerned government institutions and curriculum experts' interviews, textbooks writers' questionnaire and document review are analyzed in a holistic manner.

Terminology development requires a systematic planning which provides a model that can guide the activities intended to be carried out. Accordingly, Amharic primary education terminology development is expected to follow a specific approach to properly manage the task. Thus, in principle, the term development approach used to develop primary education terminologies is expected to be based on national term development approach. However, concerned government institutions' experts, who are believed to play key roles in term development efforts, gave the following responses about the absence of term development approach at national level:

> I didn't observe any policy in my institution regarding the translation of words so far (ANRSCTPBLE10 Interview).

> There is no framework that guides the term formation process (AELCSTE11 Interview).

> There is no term formation model selected by the institution to do terminological works (ESASTE12 Interview).

We are not involving currently on term development activities, so we are not implementing any term development approach to accomplish the task (MOSTSPE14 Interview).

As the data witnessed, there is no a recognized term development approach that is serving at institutional or national level. The terminological works are not done based on an established system. An expert from the Ministry of Culture and Tourism (MOCTSLE13 Interview) adds that the question of term development approach at national or federal level could get response after ratification of the country's language policy.

Most of the concerned government institutions and the curriculum experts of Amhara regional state and MoE have stated the absence of detailed guideline which deals with Amharic terminologies development. Furthermore, the concerned government institutions' experts (ESASTE12 Interview, MOCTSLE13 Interview and MOSTSPE14 Interview) expressed that there is no terminology guideline which serves at national and/or institutional level. Similarly, the data from the four subjects (i.e. Civics & Ethical Education, Integrated Science, Mathematics, and Social Studies) curriculum experts, who were working in the MoE and ANRS Education Bureau, reiterated the same fact.

However, only the integrated science curriculum experts (ANRSEBISEs2 Group Interview) mentioned a document written in Amharic script entitled, "Guideline for Authors of Primary Education Learning and Teaching Materials, and Criteria or Standard for Measuring quality of Books". This document is not published and it is a first draft presented for discussion at a seminar in 1999 E.C. In fact, according to this draft guideline to keep the standard of a textbook, the language of a textbook should be familiar, interesting, precise, clear and a fit for the students' age and ability, but in the document the issue of terminology development and use is not separately treated.

Some of the concerned government institutions experts have stated the following reasons for the absence of a national term development approach and a terminology guideline at national and/or institutional levels:

- Lack of much attention for terminology development at policy level (ANRSCTPBLE10 Interview);

- Nowadays, mostly terminological works are not done at a project level, but they are executed in a haphazard way (AELCSTE11 Interview);

- Lack of awareness about forming and regulating term development approach (AELCSTE11 Interview);

- Lack of cooperation among stakeholders (AELCSTE11 Interview);

- Absence of a language policy (MOCTSLE13 Interview); and

- Influence of liberal or unregulated language use of educated members of the society (ESASTE12 Interview).

These reasons could be indications that terminology development attempts are not properly regulated. One of the interviewed curriculum experts strengthens this idea as follows:

> As far as I know, textbook writers themselves decide the terms that they use in their books. They can use any term that they feel appropriate. There is no guideline about terminology use. The terms will be evaluated, after textbook writers wrote the books. However, since the time of evaluation is very short, it is so difficult to get appropriate feedbacks. (ANRSEBQAE5 Interview)

An expert from the Ministry of Culture and Tourism (MOCTSLE13 Interview) has expressed the urgent need for systematizing term development activities in the following statements;

> There are terminology problems; so demands frequently come to our office to get professional support. Many new words enter into indigenous languages, but they do not convey clear meanings. There might be a comment that says it is not known, even how the translation was done. Our office did not offer any support in collaboration with other stakeholders for the preparation of curriculum, because we did not create a system that helps us to accomplish this task so far. However, there is a belief as it should be done, since it is a clearly identified problem.

Likewise, in relation to terminology guideline, textbook writers were asked as to whether they use terminology guideline/s when they write textbook(s). Accordingly, among 30 respondents, ten of them replied 'yes' and the rest (20) informants responded 'No'. Four of the ten informants who responded "Yes", mentioned that they use documents prepared by MoE and ANRS Education Bureau whereas the rest four indicated that they use *Science and Technology Dictionary (English-Amharic)* prepared by Academy of Ethiopian Languages (1996) . However, these documents and the dictionary do not guide how to develop terminology. While the documents that are prepared by MoE and ANRS Education Bureau provide general ideas about language use in the textbooks, Science and technology

dictionary (English-Amharic) only presents terminologies without showing how to perform the task of term development. These indicate that textbook writers including those who responded "yes" do not use terminology guideline while they involve in the task of terminology development.

Despite lack of established terminology guideline, the interview data revealed that textbook writers and curriculum experts are using as a whole about ten criteria to develop terminologies in writing and editing textbooks. The criteria are familiarity, consistency, precision, appropriateness, cultural acceptance, priority for target Language, simplicity, transparency, acceptability in relation to word formation rules of Amharic, and fitness for the students' age, ability and grade level. Among these criteria, "familiarity" and "transparency" were indicated as they are used by seven and six respondents, respectively, out of 16 informants. As to the rest of the criteria, no criterion was found to be used by more than three respodents. However, in principle, textbook writers and editors are expected to apply those criteria consciously in developing terms while they are writing and editing textbooks. This indicates that the work of terminology development is not handled in a systematic manner. This is further supported by the following two textbook writers:

> Respondent Code 01, "Since Amharic is my first language, I didn't bother much about terminology principles."

> Respondent Code 05, "As far as I know, terminology principles, so far are unknown in our country context in textbook preparation."

The above two replies witness that principles of terminology development are given little attention in the preparation of textbooks. Besides, as the replies indicate, textbooks writers are not aware enough about the role of terminology in achieving quality primary education.

The textbook writers, the curriculum and concerned government institutions experts have also indicated that direct loan, loan translation, documents, mass media, consulting professionals and creating new forms are sources of terminologies. As to the experts, direct loan words are used only when equivalent Amharic term is not available. Besides, textbook writers are not encouraged to use borrowed terms, if they have opportunities to use local (target language) terms. The curriculum and concerned institutions' experts have stated the following reasons for using equivalent terms rather than direct loan terms:

- Equivalent terms develop/ enrich Amharic;

- Equivalent terms strengthen users ability to use Amharic;

- Since equivalent terms serve as a bed rock to offer mother tongue education, they help students to understand the lesson/concept clearly and avoid confusion; widen students' chance of mastering/ understanding the contents of the lesson; they help students to get their families academic support, enable them to move from simple to complex and to relate the lesson with their experiences.

- Since the textbook is to be prepared in Amharic, the language's words should be used in principle;

- Equivalent terms help to make the MOI localized or indigenous.

Therefore, direct loan is considered as a last option to fill terminology gaps. However, if equivalent terms are not available in Amharic, borrowing terms directly from other languages is taken as a viable option in the four subjects. Most of the terms were borrowed from English. Besides, from the local languages, mainly Geez serves as a source of borrowing for Amharic. The informants further confirmed that since Amharic lacks equivalent terms to translate some of the concepts of the subjects, using loan words is the best option. In this regard, a curriculum expert of mathematics (ANRSEBMCE3 Interview) expressed a compelling situation as follows:

> If you want to express the term 'rectangle' in Amharic, you have to use long expression. Its two parallel sides are equal. How can you express it in Amharic? If you name it as 'gonnä aratt', it cannot express it. The local equivalent term indicates only the number of sides. Therefore, if you call it 'tämäsasay gonnoččʉ ïkkul yähonu gonnä arat mïsïl', it extends to a sentence. It is not an equivalent term, but it is a description of a rectangle. In this case, Amharic is not competent enough to provide an equivalent term, so that the English term will be used in the compelling conditions.

There are also other difficult situations, which force one to use loan terms during the preparation of the four subjects' textbooks. For example, familiar loan words like "television" are directly used without translation or modification. Besides, according to the Integrated Science curriculum expert (ANRSEBISCEs2 Group Interview), the textbook writers and editors may face challenges to translate several science and technology English terms into Amharic.

In the interviews, the curriculum experts were asked to reflect on the way they control the quality of terminologies used in the textbooks. Accordingly, they stated that the following term development activities are implemented to keep the quality of terminologies during the curriculum development:

- Giving orientation for the textbook writers about the terms to be used in the textbooks;

- Editing and evaluating terminologies before publishing the textbook;

- The institution advises textbook writers to use the terminologies included in *Science and Technology Dictionary (English-Amharic)* published by Academy of Ethiopian Languages for its preparation several language and subject matter experts had participated;

- Checking whether the terminologies used in the textbooks are familiar (Consistent) with the regional language use or not, before their publication; and

- Evaluating terms by comparing their use in different grade levels.

However, as curriculum experts witnessed, contribution of language experts (i.e. terminologists and linguists) in curriculum development is insignificant. The Integrated Science curriculum expert (ANRSEBISCEs2 Group Interview) adds that only subject specialists currently participate in writing and editing textbooks. Thus, language experts did not get a chance to comment on newly created terms in particular or language use in general in the textbooks.

Moreover, the curriculum experts stated that the task of controlling quality of terms is being done based on common sense. This is because there is no clear system that enables them to keep the quality of terminologies. This idea is further expressed by a mathematics curriculum expert (ANRSEBMCE3 Interview) as follows:

As far as I know, there is no a system established to accomplish this task. However, during the textbook preparation and evaluation, we always argue seriously with each other. We evaluate the terms by comparing their use in different grade levels. Nevertheless, we are not implementing this as an established system.

Moreover, as stated above, documents, mass media, consulting professionals and creating new forms also served as sources of terminologies for textbook writers. The informants mentioned that *Science and Technology Dictionary (English-Amharic)*, which is published by Academy of Ethiopian Languages, served as an important terminological resource for Integrated Science, Mathematics and Social Studies subjects. Besides, previous textbooks, dictionaries, literary works and texts are also used as sources of terminologies. Especially, Civics & Ethical Education, Integrated Science, and Mathematics textbook writers mentioned previous

textbooks as their sources. Civics & Ethical Education textbook writers also use terms that are used in the mass media. Besides, while some textbooks writers have consulted curriculum experts and language professionals to search for Amharic equivalents for English terms, few of them have reported that they sometimes create their own terms to solve terminological problems.

As to the document review data, totally 2579 terms were identified. These include 441 Civics & Ethical Education, 1028 Integrated Science, 403 Mathematics, and 707 Social Studies terminologies. The following table shows the sources of the terms in each subject:

Table 1

Sources of terminologies for the four subjects

S. No	Type of the Subject	Sources of Amharic terminologies			
		Local Languages	**Source Language**	**Mixing Local & Source languages**	**Total**
1.	Civics & Ethical Education	395	20	26	441
2.	Integrated Science	700	201	127	1028
3.	Mathematics	313	38	52	403
4.	Social Studies	624	42	41	707
	Total	2032	301	246	2579

Table 1 shows that the sources for 78.79% of the identified terms are local languages (especially, Amharic and Geez) while the source for 11.67% of the terms are the source language (English), and the source for 9.54% of the terms is combination of local and the source languages. Furthermore, as it is indicated in Table 1, Integrated Science textbooks have more direct loan and mixed terms than textbooks of any other subjects.

Regarding terminology development, the cultural policy of Ethiopia in article 6.6 states that "Scientific and technological terminologies that could help in promoting the capacity of the languages of the country shall be developed; translation works that could assist in sharing the experience and knowledge of the world shall be widely practiced" (1997, p. 35).

The policy does not indicate any thing about the how of language development and translation rather it only puts the general intention of the current government regarding the development of the local languages.

Overall, even though there is no clear policy that guides the how of foreign terms inclusion into Amharic, most of the sample data presented above indicated that loan terms are used if equivalent terms in Amharic are not found. This is the most preferred approach as it was repeatedly reported by the informants during the interview sessions because they believe that this approach enables students understand the lesson easily.

Term formation methods

The methods that had been employed to form PEATs were identified by analyzing the terms excerpted from the textbooks. Besides, the definitions that are given below for each sub-technique of term formation methods are mostly based on ISO 704 (2009), because it is an international term development document that serves to create new terms for different disciplines as well as other specialized communications.

Creating neoterms

This is the process of creating new terms. The sub-term formation techniques like derivation, compounding, blending and abbreviation (such as short form, clipped form, abbreviation, initialism and acronym) can be employed to create new terms.

Derivation: It is a process of deriving a new term by adding one or more affixes to a base. The following terms are taken from the textbooks as examples:

(1) ***Civics & ethical education:***   ***Integrated science:***

Terms	Gloss	Terms	Gloss
šïbbïr-täñña-nnät	terrorism	mugïd-ät	resistance
tä-mokïr-o	experience	mä-rrab-o	reproduction
t'ïs-ät	violation	ïffïgï-ta	density
wägän-täñña-nnät	partiality	mïg-at	inhalation
jïmmar-o	start	qärär-a	decantation

Mathematics:		***Social studies:***	
Terms	Gloss	Terms	Gloss
hulätt-awi	binomial	hulättï-yoš	bilateral
lït'ʼaṭ-e	extension	qïlïm-ät	colour
mïn-ät	rate	qïmïbbïb-amma	coniferous
ïkkul-ta	equation	zur-it	revolution
yaw-it	constant	dïnn-äna	afforestation

As presented in the above examples the morphemes *-nnät*, *tä - o*, *-ät*, *-o*, *mä - o*, *-ta*, *-at*, *-a*, *-e* and *–it* are used to form nouns. Besides, the morphemes *-awi*, *-yoš* and *-amma* are used to form adjectives. The suffixes *-o*, *-ät*, *-at*, *-e*, *-a and -äna* are added to bound bases to form nouns, as in *ǰïmmar-o*, *mugïd-ät*, *mïg-at*, *lïťʼaťʼ-e, qärär-a* and *dïnn-äna,* respectively. Likewise, the suffixes *-nnät, -ta* and *-it* are added to free bases to form nouns, as in *šïbbïr-täñña-nnät*, *ïffïgï-ta* and *yaw-it*. Moreover, the suffixes *-awi*, and *-yoš* are separately added to free morpheme *hulätt-* to form two different adjectives (i.e. *hulätt-awi* and *hulättï-yoš*). Besides, an adjective term can be coined by adding the suffixes *-amma* to an adjective and *-täñña* to a noun, as in *qïmïbbïb-amma*, šïbbïr-täñña and wägän-täñña.

On the other hand, the noun formation pattern of the terms *tä-mokïr-o* and *mä-rrab-o* differs from the others. The affixes *tä - o* and *mä - o* are added to the free base *-mokïr-* and bound *base -rrab-,* respectively, to form the terms. They are discontinuous morphemes.

Compounding: It is a process of forming a new term by combining existing two or more words, and the term represents a concept that differs from its constitute parts (Sager, 1996). Compound terms include *Complex terms and phrases*. Look at the following examples from the textbooks:

(2) *Civics & ethical education:*   *Integrated science:*

Terms	*Gloss*	*Terms*	*Gloss*
hʷalaqärïnnät*	backwardness	balla bʷanbʷa***	y-tube
mïkr bet***	council	qoläťä gäbär**	epidermis
sïra amärar***	leadership	zärä mïgb***	endosperm
betä-ʔïmïnnät**	religious center	gäbälo astäne***	reptile
qïrsʼä-mängïst**	system of government	gïllä rïkbä bïnnañ	self pollination
afä-gubaʔe**	spokesperson	sʼïnsä-ʔïnqulal **	egg

Mathematics:		*Social studies:*	
Terms	Gloss	Terms	Gloss
sänťäräž čʼawäta***	magic square	mäkanä-hiywät**	habitat
sïrʔatä-wïqïr**	coordinate system	sïrä-hïwa**	troposphere
qäťe amʷay***	complement	amïbamïdïr*	plateau
gonä-sost**	triangle	betä arawit**	zoo
aqrab sïlet***	approximate value	bäynä mängïstat**	inter-govermental

The complex Amharic terms in (2) are added to the language through compounding process. The elements of a term are fused* or hyphenated**

or stand apart***. On one hand, the constituents of a complex term can be linked by a compounding morphem *-ä-,* as in *sïr-ä-hïwa* and *bet-ä-arawit*. On the other hand, complex terms can be formed without linking element, as in *hʷalaqärïnnät*, *balla bʷanbʷa* and *sänťäräž č´awäta*. As shown in (2), in most cases, complex terms could have two constituents, as in qïrs´ä-mängïst which includes two elements (i.e. *qïrs´* and *mängïst*). Howerver, the compound pattern of the complex term *gïllä rïkbä bïnnañ* show that a complex term might have more than two constituents.

Moreover, there are some cases where terms of the target language and the source language are combined or hybridized to form complex terms, as in *akalä fängäs* "hypha". In the example, the first constituent *akal* is an Amharic term whereas the second element *fängäs* is borrowed from English.

The following *phrases* are formed by joining Amharic words to substitute English terms.

(3) *Civics & ethical education:*   *Integrated science:*

Terms	Gloss	Terms	Gloss
yä-gara sïmïmmïnnät	consensus	Wusťawi yä-qoda kïfïl	dermis
yä-ʔassärar sïrʔat	procedure	yä-kïhlot lïyunnät	voltage
ťänkarra yä-sïra bahïl	industriousness	yä-dur ïnsïsa mäťťäläya	sanctuary
		yä-ʔayär qäräťʼit	alveoli

Mathematics: *Social studies:*

Terms	Gloss	Terms	Gloss
hisabawi sïllet	operation	qïritä akalat-ïnna qïritä qus tämäramari	archaeologist
yä-sïllet bahïrïyat	properties	yä-gïnïññunnät märäb	network
yä-quťïr hohe	digit	yä-hïddag märïǰǰa	key
yä-mäftïhe sïbsïb	solution set	ťamra yä-dänn ïrïša	agroforestry
yä-gara männäša näťʼib	vertex		

Most of the phrases in (3) begin with possessive prefix *yä-*, as in *yä-ʔassärar sïrʔat*, *yä-kïhlot lïyunnät*, *yä-quťïr hohe* and *yä-gïnïññunnät märäb*. In this case, the genitive morphem *yä-* links the heads with their constituents. For example, in the phrase *yä-quťïr hohe*, the head "*hohe*" joined with its predecessor "*quťïr*" by "*yä-*". Besides, adjectives are used as a constituent of phrases, as in *ťänkara* yäsïra bahïl, *wusťawi* yäqoda kïfïl, *hisabawi* sïllet and *ťamra* yädän ïrïša. In these terms, the first

constituents are adjectives. These show that phrases could have two or more constituents. For instance, the compound pattern of the term *qïritä akalatïnna qïritä qus tämäramari* indicates that a phrase may have five elements.

Blending is a process of clipping two or more words in order to form a term that represents a single concept. The following blends are identified from Integrated Science and Social Studies textbooks:

(4) *Integrated science:*

Terms	Gloss	Terms	Gloss
muqäläki (muqät + läki)	thermometer	bïranfi (bïrhan + asalafi)	cornea
räqibäs (räqiq + bïs)	microphyle	tïnbärr (tïnfaš + bärr)	glottis
tïnmäz (tïnfaš + mäzïgiya)	glottis	tïnkärät (tïnïfaš + käräťit)	alveoli
tïnbʷa (tïnfaš + bʷanïbʷa)	trachea	ïnquliťi (ïnqulal + iťi)	ovary
akïzänïg (akïbabi + zänïgg)	radius	gïnbanïddät (gïnbata + nïddät)	metabolism
waqlami (wuha + aqilami)	algae		

Social studies:

Terms	Gloss
mäkahïwa (mäkakkäläñña + hïwa)	mesosphere
muqähïwa (muqät + hïwa)	thermosphere
zïqähïwa (zïqqïtäñña + hïwa)	stratosphere

Examples of blending are not found in Civics and Ethical Education, and Mathematics textbooks. However, as the above examples show, in other subjects, blended terms are formed through the processes of clipping by shortening of longer words. For instance, the long forms of the blended terms *gïnbanïddät* and *mäkahïwa* are formed from *gïnbata + nïddät* and *mäkakkäläñña + hïwa,* respectively. In the clipping process, in the first term the syllable *-ta* and in the second term the syllables *-käl* and *-äñña* are deleted. Therefore, as indicated in (4) the constituents of a long form are shortened by deletion to form blended terms.

Abbreviated forms: They usually enable to form concise and manageable (user-friendly) terms. According to ISO 704 (2009), abbreviated forms consist of s*hort form*, *clipped form, abbreviation*, *initialism* and *acronym.* Among these abbreviated forms very few instances of initialism are identified from the Mathematics and Social Studies subjects' textbooks.

Besides, an acronym is only discovered from Social Studies textbooks. However, in Civics and Ethical Education and Integrated Science textbooks any abbreviated form is not observed.

Initialisms are formed by taking the initial letters of the constituents in a compound, and they are read by naming the letters. The following data show examples of initialisms:

(5) ***Mathematics***:

Terms	Gloss
t.ga.b (tïnïššu yägara bïzzet)	L.C.M (least common multiple
t.ga.a (tïllïqu yägara akkafay)	G.C.F (greatest common factor)
a.go.a tägaťaminnät (angïl gon angïl tägaťaminnät)	ASA postulate (Angle Side Angle postulate)
go.a.go tägaťaminnät (gon angïl gon tägaťaminnät)	SAS postulate (Side Angle Side postulate)
go.go.go tägaťaminnät (gon gon gon tägaťaminnät)	SSS postulate (Side Side Side postulate)

Social studies:

Terms	Gloss
tä.mä.d (yä-täbabärut mängïstat dïrïjjït)	UN (United Nations)
i.fe.de.ri (ityopʼya federalawi demokrasiyawi ripublik)	Ethiopian Federal Democratic Republic (EFDR)

The examples illustrate that the beginning letters of the constituents of the compound terms are taken to form the Intialisms. Nevertheless, when the possessive prefix appears in a constituent of a phrase term, the prefix is omitted to form the abbreviated term. For instance, as presented above, the shortened form of the compound term *tïnïššu yä-gara bïzzet* is *t.ga.b*. Therefore, in the process of forming the intialism, the possessive prefix *yä-* is not taken into account. Moreover, there are cases where initialism is combined with another term like, *a.go.a tägaťaminnät,* in Mathematics textbooks. This compound term is coined by combining the intialism *a.go.a* with the second constituent abstract noun *tägaťaminnät.*

As mentioned before, *acronym* is another type of abbreviated forms. It is created by taking initial letters of the elements in a compound term, and it is pronounced as a term. For instance, the acronym *ʔaduťïd* "WWF/ World Wildlife Fund" is detected from social studies textbook. Its long form is *ʔaläm dur ïnsïsat tïbäqqa dïrïjjït*. In order to form *ʔaduťïd*, dots are not used to represent the parts that are omitted from the long form.

Using existing forms

Existing forms can also be used to express new concepts in the target language. This term formation method includes: *conversion*, *terminologization*, *semantic transfer within a special language* and *Transdisciplinary borrowing*. In this study, an attempt has been made to check whether these term formation methods are implemented in the textbooks of the four subjects. Therefore, except conversion, the other term formation methods were found to be used to coin terms in the textbooks.

Terminologization: This term formation method is the process of using a general language word or expression in a special language to express a different concept. The following examples illustrate terms that are formed using this method in the four subjects' textbooks:

(6) *Civics & ethical education:*

Terms	*Gloss*	
	Basic	*Extended*
mäččačal	patience	tolerance
mäffäqaqäd	care for each other	will and interest
mïrïč´a	choice	election
kïllïl	boundary	region, state
tïsïssïr	to be chained together	interconnection
gïls´ïnnät	clarity	penness

Integrated Science:

lïkkïft	adverse affect of a malign spirit on health	infection
qïrrafi	thing peeled off	crust
qob	hat worn by monks and nuns	cap (botany)
wäna	deserted (house)	vacuum
käy	omething that protects	opaque
kulkul	placed in a row or line	electric series

Mathematics:

sïfir	measured out	measurement
qïlïqqïl	mixed	union
ïmun	something that convinces	postulate
gïlbïť	overturned	reciprocal
bet	house	place value

Social studies:

mäqqämäč´a	sitting place	seat (capital city)
mäqqäbäl	receive	conversion
mäfča	spanner, key	map legend
qore	wooden bowl	crater
täfasäs	gutter	basin

As shown in (6)**,** for instance in Civics and Ethical Education, the general language word *kïllïl* "boundary", is used to mean "region or state". Likewise, in Integrated Science, the word *lïkkïft* "adverse effect of a malign spirit on health" is used to designate the concept "infection", which is the attack of an organism's body by disease causing bacteria. In Mathematics, the general language word *qïlïqqïl* "mixed" is used to denote "union", which means a set of all elements in a collection. Moreover, in Social Studies, the word *qore* "wooden bowl", is used to mean "crater", which refers to a cup-shaped depression that marks the mouth of a volcano. Therefore, terms that are created through terminologization are described as polysemous words because they have different meanings in general and special languages.

Semantic transfer within a special language: One of the rarely used term formation methods in the textbooks is semantic transfer within a special language. This method employs the use of one term for another concept in the same domain based on logical extension. The following data display formation of terms using this method:

(7) *Integrated science:*

hayl = compression	astälalïfoš = conduction
= power	= current
tän = gas	sïrïč'č´ït = distribution
= evaporation	= mass

Civics & ethical education and social studies (Social science):

lïyunnät = diversity	täliʔïko = mission
= variation/ difference	= distance
mäggäläč´a = manifestation	tägalač´ = vulnerable
= element	= victim
sïrʔat = discipline	= endangered
= system	

The examples in (7) point out that a term might have more than one meaning within a specific field. For instance, in Integrated Science, the term *hayl* refers to two concepts (i.e. compression and power). Moreover, since Civics and Ethical Education and Social Studies subjects are related Social Science fields, they share several concepts. As a result, as shown in

the above examples, a term can serve in both subjects to refer to similar concepts. Hence, the term *lïyunnät* refers to 'diversity" and "difference".

Transdisciplinary borrowing: Since it is a process of borrowing a term from a specific domain to another domain to express a new concept within the same language; it is also referred as internal borrowing. Even if the concepts are part of different subjects (domains), they share related or comparable meaning. In the textbooks, few terms are created using this method; e.g.,

(8) hohe = syllabary symbol (Linguistics)   ïrkän = scale (Integrated science)
      = digit (Maths)   = terracing (Social studies)

  rïbbi = exponent (Mathematics)   č´ärär = radiation (Integrates science, Social studies)
      = cattle breeding (Integrated science)   = ray (Mathematics)
  dähïnïnnät = safety (Integrated science)   č´ana = burden (Civics & Ethical education)
      = security (Social studies)   = pressure (Social studies)
  sïrrit = composition (Integrated science)   = compression (Integrated science)
      = law (Social studies)
      = land ownership law (Social studies)
  tˇïmrät = combination (Integrated science)
      = ratio (Social studies)

As shown in (7 & 8), the terms that are created *through semantic transfer within a special language* and *transdisciplinary borrowing* methods are polysemous, which designate two or more concepts.

Translingual borrowing

This is a method of term formation through borrowing that includes direct loan and loan translation from other languages.

Direct Loan: a term is borrowed with its all morphological and semantic features if there is no equivalent term that designates the concept in the target language. For example, the following nouns are adopted from the source language (i.e. English) and used in Amharic without any modification:

(9) *Civics & ethical education:*   *Integrated science:*

Terms	*Gloss*	*Terms*	*Gloss*
sivic	civic	haypotalamäs	hypothalamus
ripäblik	republic	metaloyd	metalloid
kawnïsl	council	ametr	ammeter
federešn	federation	itanol	ethanol
parti	party	oksayd	oxide

Mathematics: *Social studies:*

Terms	*Gloss*	*Terms*	*Gloss*
beta	beta	selïšs	celsius
teräm	theorem	tïropopoz	tropopause
aritmetic	arithmetic	awïstralopitäkäs anamänsïs	Australopithecus anamnesis
delta	delta	ošïniya	oceania
gamma	gamma	ozon	ozone
pïrizïm	prism	wayïld bist	wild beast

As indicated in (9), names of chemicals, minerals, air, measurements, equipments and other basic concepts of Integrated Science, Mathematics, Social Studies and Civics and Ethical Education subjects are borrowed from the source language using direct loan.

Initialisms and acronyms are also borrowed from the source language using direct loan method as the following examples are cases in point:

(10) *Integrated science:*   *Social studies:*
  ečč.ay.vi = HIV (initialism)   igad = IGAD (acronym)
  edïs = Aids (acronym)   yunisef = UNISEF (acronym)
                          yunesko = UNESCO (acronym)

The initialism and acronyms, which are stated above, are borrowed without any phonological or morphological changes.

Furthermore, the forms of some terms that are borrowed from the source language (English) are modified in order to adjust them to the phonological and morphological features of the target language (Amharic). The following data illustrate examples of this kind from the four subjects:

(11) *Civics & ethical education:*   *Social studies:*

Terms	Gloss	Terms	Gloss
demokïrasiyawi (demokïrasi-y-awi)	democratic	sulïťanet (sult-i-anet)	sultanate
polätika (polätik-a)	politics	kubanïya (kubanïy-a)	company
		posta (post-a)	post

Integrated science: *Mathematics:*

Terms	Gloss	Term	Gloss
seri	series	kub	cube
bezamma (bez-amma)	basal		
turbina (turbin-a)	turbine		

In the above data, the adjective makers (-*awi*, -*amma*) and the nouns creator (-*a*) are used to conform the terms to the structure of the target language as in *demokïrasiy-awi*, *bez-amma* and *posït-a*, respectively. Phonological processes such as assimilation, deletion and sound change took place on the terms *kubanïy-a*, *seri*, *turbin-a* and *kub*. Following the phonological processes, the noun maker -*a* is added to the terms *kubanïy-a* and *turbin-a*. Sound change is involved on the formation of the term *kub* from the term *cube* (kyoob). Besides, in the borrowing process of the noun "sultanate", the voiceless alveolar stop /t/ is changed to its ejective counterpart /t'/.

In addition, new terms are borrowed from the local languages (mostly from Geez) to provide equivalents for foreign terms. The following examples witness this experience:

(12) *Integrated science:*   *Mathematics:*   *Social studies:*

Terms	Gloss	Terms	Gloss	Terms	Gloss
kärbeza	vagina	laʔïlay/ laʔïl	numerator	hagay	winter
zäʔakal	organism	qädamay	predecessor	mäs´äw	autumn
ïskit	penis	tahïtay/ tahït	denominator		
		ahad	unit		

As the above data show, Amharic borrows terms from Geez to represent the English concepts which are parts of the academic subjects. All the above terms are nouns except *laʔïlay*, *qädamay* and *tahïtay* which are adjectives.

Loan Translation: It involves translation of morphological elements of a source language term into a target language to form a new term based on lexical rules and word order of the target language (Sager, 1990). It is also referred to as calque. In this type of term formation method, phrases and complex terms are translated literally, partially or totally into the target language. The following data reveal that loan translation is one of the common term formation methods that are found in this study:

(13) ***Civics & ethical education:***   ***Integrated science:***

Amharic equivalent	*Source (English term)*	*Amharic equivalent*	*Source (English term)*
hïggawi sïlïťťan	legal authority	qïrret nädaǰ	residual petroleum
mälkam asïtädadär	good governance	baläbzu hïwas	multi-cellular
mäsärätawi mäbït	basic right	täfäťroʔawi dänbi	natural factor
mahïbärawi ťïgäññannät	social dependency	tänqʷaš läwačʼ	catalytic converter
yäyïsmulla hïgg	nominal law	bäri akalat	luminous bodies
gulbät bïzbäza	labour exploitation	ïwre näťb	blind spot

   Mathematics: ***Social studies:***

Amharic equivalent	*Source (English term)*	*Amharic equivalent*	*Source (English term)*
hïggäñña kïfïlïfay	proper fraction	yäʔïsʼwat šïfan	vegetation cover
lïkïkk wïssïn mäsmäročč	congruent segments	yähïzïb ťïgïggït	population density
mäsmärawi ïkkulta	linear equation	fïssät mäsmär	flow line
rïtuʔ wädäräñña	directly proportional	mäläya bahïry	distinguishing character
täqʷaračʼ qäťťïta mäsmäročč	intersecting lines	mahbärawi lïmat	social development
qïlïqqïl quťïr	mixed number	taddaš hayl	renewable energy
gïlbïťʼ sïllet	reciprocal operation	yagadälä qïrsʼ	spherical shape

All the Amharic data in (13) indicate that most of the terms are phrases (e.g., *mälkam asïtädadär*, *baläbzu hïwas*, *hïggäñña kïfïlïfay* and *fïssät mäsmär*) and some of them are complex terms (e.g., *ïwre näťb, gïlbïťʼ sïllet and qïlïqqïl quťïr*). Every element of a term in the source language is translated into local language, especially Amharic or in some cases into Geez. Among the constituents of the above Amharic equivalents, the words like *hïwas*, *rïtuʔ*, *ʔïsʼwat* and *bahïry* are Geez words.

In some cases, constituents of borrowed terms are not entirely translated into the target language. Therefore, there are hybrids- terms that are created by combining the source and target languages' words as the following examples illustrate:

(14) *Civics & ethical education:*   *Integrated science:*

Terms	Gloss	Terms	Gloss
federalawi sïrïʔat	federal system	litmäs amälkač wäräqät	litmus paper indicator
sivic mahïbär	civic association	šälïd ïsatä gämora	shield volcano
ikonomiyawi märho	economic principle	bïrät astäne oksayïd	iron oxide
		asid zïnab	acid rain

Mathematics:

Terms	Gloss		
aksis mïťïťťïn	axial symmetry	faranayt ïrkän	Fahrenheit scale
		i-karbonamma wïhïd	non-carbonic compound
qäťťe pïrizïm	perpendicular prism	elektïrostatikawi qïnťaťit	electrostatic particle
ven mïsl	Venn diagram	kemikalawi gulbät	chemical energy
tïrikotomi bahrïy	trichotomy property	dïññ kïltoʔoksayïd	sulphur dioxide
negative dïfn quťïr	negative integer		

Social studies:

Term	Gloss	Term	Gloss
agär aqäf parïk	national park	tïllïqu meridiyan	prime meridian

The Amharic terms in (14) are created by hybridization process whereby terms are coined by combining linguistic elements from Amharic, Geez and English. For instance, while the first constituents of the terms *sivic mahïbär*, *asid zïnab* and *aksis mïťïťťïn* are English, the second elements of the terms are Amharic. Furthermore, nativization process of the foreign terms takes place using the adjective makers *-awi* and *-amma*, the Geez negative marker *i-* and the prefix *kïlto-* as in *federal-awi* "federal", *i-karbon-amma* "non-carbon-ic", and *kïlto-ʔoksayïd* "di-oxide". As these examples witness, the affixes are translated, but the bases of the constituents/terms remained as they are.

The following table illustrates to which extent the term formation methods were implemented to form new terms:

Table 2

Frequency of Term Formation Methods that are used in the textbooks

S.No	Term Formation Methods		Civic & E. Frequency	Integ. Science Frequency	Mathematics Frequency	Social Studies Frequency	Total Frequency			%
1.	Creating Neoterms									
	1.1 Derivation		24	63	22	28			137	5.31
	1.2 Compounding	Complex	40	120	22	63	245			12.95
		Phrases	13	30	14	32		89	334	
	1.3 Blending		-	15		3			18	0.70
	1.4 Abbreviating	Initialisms	-	-	2	2	4			
		Acronyms	-	-	-	1	1	5		0.19
		Sub total	77	228	60	129			494	19.16
2.	Using Existing Forms									
	2.1. Terminologization		42	32	59	52			185	7.17
	2.2. Semantic transfer within a special		6	2	1	7			16	0.62
	2.3. Trans-disciplinary borrowing		5	16	14	9			44	1.71
		Sub total	53	50	74	68			245	9.50
3.	Translingual borrowing									
	3.1. Direct loan		22	204	44	47			317	12.29
	3.2. Loan Translation		207	407	192	328			1,134	43.97
		Sub total	229	611	236	375			1,451	56.26
		Total	359	889	370	572			2190	84.92
4.	Common terms in general and special languages			139	33	135			389	15.08
		Grand total	441	1028	403	707			2579	100

As Table 2 shows, the term formation methods were used in different degrees to form primary education terminologies. Hence, translingual borrowing (56.26%) is the most frequently used term formation method, in the data under consideration. Of the two trans-lingual borrowing methods, the loan translation (43.97%) is the widely used method followed by compounding (12.95%) and direct loan (12.29%). Besides, loan translation, direct loan, compounding and derivation methods were employed more frequently in the formation of terminologies in Integrated Science than other subjects. On the contrary, as the table indicates, abbreviating (0.19%), semantic transfer within a special language (0.62%), blending (0.7%) and trans-disciplinary borrowing (1.71%) are rarely used term formation methods.

Moreover, Table 2 demonstrated that 15.08% of the excerpted terms from the textbooks are serving in general language. Many of these terms are used in Integrated Science, Social studies and Civics and Ethical Education subjects, but only some of the general language terms are used to express mathematical concepts.

Discussions

The first specific objective of the research was examining the term development approach used to develop PEATs and the reasons behind implementing it. The results of this study reveal that, even if there is no clear language policy and/ or terminology development guideline at institutional, regional and national levels, in most cases, puristic approach is used to form PEATs. This finding is consistent with the results of Taddese (n.d, as cited in Madiba, 2001), Richter (1988, 1989) and Amsalu (1980). All of which indicate that much emphasis was given for internal sources instead of borrowing for modernization of Amharic.

The second part of the first specific objective of the research, has tried to elucidate why a specific term formation approach was promoted to develop PEATs. Accordingly, the results demonstrate that the cultural and pedagogical advantages are the main reasons that underlie the intention of implementing puristic approach for terminology development. Since it gives priority for Amharic equivalents of source language terms, it enables to maintain the language and assists students to grasp the concepts of the lessons that they have learnt. These ideas are in line with Myking (1977), Ferguson (1977), UNESCO (2005) Drame (2008) and Alberts (2010) that state the role of terminology elaboration in language development and maintenance as well as in the society's all round development in different domains like education, science and technology etc. Moreover, the findings related to the stated reasons of implementing chiefly puristic approach (giving priority for target language sources) are generally compatible with those researchers such as Matsuda et al. (2008) that state the implementation of semantic adoption or target language equivalents of the source language terms is relatively easy (transparent) to guess the meanings of new terms. However, puristic approach is criticized for its focus on language rather than communicative needs of the language users (Bugarski, 1983; Fishman, 1983, as cited in Madiba, 2001).

Likewise, indentifying all and dominant term formation methods that are applied to coin terms in the four subjects' textbooks was the second specific objective of this research. In this regard, the results of the study revealed that three main and eight specific term formation methods namely,

creating new terms (derivation, compounding, blending, abbreviating), using existing terms (terminologization, semantic transfer within a special language, transdisciplinary borrowing) and translingual borrowing (direct loan, loan translation) are implemented to coin terminologies. These findings broadly confirm the results reported by Amsalu (1980), Assefa (1984) Richter (1988), Takkele (2000) and Aragaw (2009). The findings of the study also demonstrate that hybridization is used to create compound terms, which is consistent with findings of Assefa (1984), Richter (1988), Takkele (2000) and Aragaw (2009). However, the present study somehow differs from the studies mentioned above because it has shown the term formation methods, namely, abbreviating (Intialisms, acronyms), semantic transfer within a special language and transdisciplinary borrowing.

Moreover, the results of the study witnessed that all term formation methods that are proposed in ISO 704 (2009), except short forms, clipped terms, abbreviations and conversion, are used to form various terms in Amharic.

In addition, according to the findings of the study, the dominantly used term formation method is *loan translation*. It is followed by *compounding* and *direct loan*, consecutively. These findings to some extent seem to be in agreement with findings of Richter (1989) and Aragaw (2009) that pointed out coinage and compounding are the most frequent term formation methods, respectively. Although compounding and loan translation are separate term formation methods, loan translations are formed by compounding target language words. Besides, Richter's (1989) definition of coinage or creation of coinage includes loan translation. Therefore, the difference between the present and previous studies possibly comes from the definitions given for the term formation methods. Since *loan translation* requires term for term replacement of source language constituents of compound terms with target language terms. During the implementation of this method the appropriateness of the patterns and meanings of the terms should be given due attention.

Conclusions

The following conclusions are drawn from the results of this study:

- Textbook writers, curriculum experts and other concerned bodies largely use puristic approach to develop PEATs. The main reasons behind using this approach are to develop Amharic, to make the lesson clear for the students, to provide the lesson from simple to complex by relating with the learners experience and to enable students to get academic support from their home environment

including their parents. Nonetheless, since there is no terminology policy or guideline that points out the term development approach that has to be used at national level, the term development endeavours are not conducted in a systematic way. They are mostly executed in a haphazard manner by the decision of individuals like dictionary makers, textbook writers, editors, translators etc.

- Possibly, eight term formation methods can be used to form PEATs, namely, derivation, compounding, blending, abbreviated forms (Initialism, Acronym), terminologization, semantic transfer within a special language, trans-disciplinary borrowing, direct loan, and loan translation. All term formation methods that are provided in ISO 704 (2009) are used to form terms except parts of abbreviated forms (i.e., short form, clipped form and abbreviation) and conversion. This shows that applying various term formation methods to develop Amharic terms is practically possible.

  In addition, the frequently used term formation methods are loan translation, compounding and direct loan. Among these term formation methods, loan translation is used to form most of PEATs. Since it offers half or full translation of constituents of a term; it is relatively more transparent than direct loan. Therefore, it facilitates understanding because it expresses the concept using a local word. Moreover, among the main term formation methods, the widely used one is translingual borrowing, under which loan translation is categorized.

Recommendations

Based on the conclusions, the following recommendations are forwarded:

- Effective terminology development endeavours require planned intervention, but there is not a clearly stated term development approach to conduct Amharic terminological works. As a result, terminological works are not being done in a systematic manner. Therefore, the Federal Government may work in collaboration with ANRS and other regions and the two chartered cities that use Amharic as a working language and MOI at primary education to fix the term development approach to be used across the country. In doing this, in the first place, the country needs to have language and terminology policies that show the elaboration of the country's modern languages. Otherwise, it would be difficult to establish strong language

development institutions that facilitate the development of Amharic, which is the working language of the country, and other regional languages' terminologies. In order to have workable Amharic language terminology development plan that incorporates terminological activities like research, standardization, dissemination, implementation, evaluation, training, maintenance as well as term development approach and its proper execution, there needs to be an institution that manage Amharic language terminology development at national level. Concerned regional states and the two federal government cities need to have supportive Amharic language development institutions.

- Various term formation methods can be used to form PEATs. These terms, as much as possible, should fulfil term formation principles. As the findings of the present study show, there are controversial, difficult and time taking. Besides, there is problem of translation and localization of concepts since translingual borrowing is used as main source of terminologies. Therefore, ANRS Education Bureau and MOE in cooperation with Academy of Ethiopian Languages and Cultures, Linguistic departments of universities and Ministry of Culture and Tourism shall offer trainings on term formation methods and principles for textbook writers, editors and other curriculum experts who involve in textbook preparation and evaluation, before they take the duty.

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Symbols

The following symbols were used to transliterate Amharic terminologies, especially in the data analysis part:

Vowels

Vowel		Example	Vowel		Example
ኧ = ä	ጨረር	č´ärär "ray"	ኤ = e	ዜጋ	zega "citizen"
ኡ = u	ሉል	lul "globe"	እ = ï	ህዝብ	hïzb "people"
ኢ = i	ሚዛን	mizan "balance"	ኦ = o	ሆድ	hod "stomach"
ኣ = a	ዋጋ	waga "value"			

Consonants and other symbols

Consonant		Example	Complex sounds		Example
ሽ = š	ሽፋን	šïfan "coverage"	ሏ = lʷa	ሎትሏታ	lotlʷatta "withered"
ቅ = q	ቀሪ	qäri "remainder" "dissolved"	ሟ = mʷa	ሟሟ	mʷammʷa
ች = č	ችግር	čïggïr "problem"	ሯ = rʷa	ሯጭ	rʷač´ "runner"
ኝ = ñ	ብናኝ	bïnnañ "particle"	ቋ = qʷa	ቋንቋ	qʷanqʷa "language"
ዥ = ž	ገዥ	gäž "ruler"	ቧ = bʷa	ቧንቧ	bʷanbʷa "pipe"
ይ = y	የብስ	yäbs "land"	ኗ = nʷa	ኗሪ	nʷari "inhabitant"
ʔ = ዐ	ዓለም	ʔaläm "world"	ኳ = kʷa	ኳተነ	kʷattänä "exhausted"
ǰ = ጀ	ጀግና	ǰägna "hero"	ዧ = zʷa	ዧሪ	zʷari "vagabond"
t' = ጡ	ጡንቻ	t'unča "muscle"	ጓ = gʷa	ጓል	gʷal "large"
č´ = ጭ	ጭቆና	č´ïqona "oppression"	ጧ = tʷa	ጧት	tʷat "morning"
p´ = ጵ	ጳጳስ	p´ap´as "pope"			
s´ = ጽ	ጽጥታ	s´äťťïta "security"			

All the above symbols, except ʔ, are adopted from Journal of Ethiopian Studies (XLVIII, p. 126-127, 2015). Besides, the symbol ʔ is taken from Takkele (2000). Since these linguistic symbols are serving in domestic well known reputable journal, they are expected to be familiar with readers.

Abbreviations used to refer Interviwees

AELCTE   Academy of Ethiopian Languages and Cultures Terminology Expert

ANRSCTPBLE   Amhara National Regional State Culture, Tourism and Parks Bureau Language Expert

ANRSEBQAE   Amhara National Regional State Education Bureau Quality Assurance Expert

ANRSEBISCEs   Amhara National Regional State Education Bureau Integrated Science Curriculum Experts

ANRSEBMCE   Amhara National Regional State Education Bureau Mathematics Curriculum Expert

ESASTE   Ethiopian Standards Agency Senior Translation Expert

MOCTSLE   Ministry of Culture and Tourism Senior Language Expert

MOEMCE   Ministry of Education Mathematics Curriculum Expert

MOSTSPE   Ministry of Science and Technology Senior Physics Expert