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Linguistically diverse 1st year university students' problems with machine translation over the three academic years

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Abstract

In this article, the term *linguistically diverse students* is used to refer to “students whose first language is other language than Latvian. The scientific data collected by the author are from 2013/2014 academic year until 2015/2016 academic year (3 academic years). Machine translation technology is constantly being applied by linguistically diverse students, but a machine cannot assess whether a sentence sounds good or bad. Motivation is a powerful force in second-language learning. The aim of the research is to find out how to solve linguistically diverse 1st year university students' problems with machine translation. Educational support and motivation enhancement are very important.

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1. Introduction

Language can be defined as a means of communication that shapes cultural and personal identity and socializes one into a cultural group (Goillnick, & Chinn, 2006). Language can be nonverbal (e.g., facial expressions, gestures) and verbal, e.g., actual speech used in conversation. Language also includes both oral components, such as listening and speaking and written components – reading and writing. It is impossible to separate language and culture.

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University students from diverse language backgrounds encounter some difficulty every day. Because language and culture are so intertwined, language minority students are expected to learn and use a tuition language and new cultural dispositions effectively. Often tuition language and culture are different from what they have learned at home. In this article, the term linguistically diverse students will be used to refer to students whose first language is other than Latvian. State universities tuition language is Latvian.

2. Theoretical basis

Data collected from academic year of 2013/2014 until academic year 2015/2016. i.e., three academic years, indicate that approximately 40% of all 1-st year students of the Faculty of Electronics and Telecommunications, Riga Technical University (RTU), are linguistically diverse (Ratniece, & Cakula, 2015). Therefore, academic personnel must be aware of diversity in their classrooms and how it may influence student achievements. The Bachelor study program provides a blend of knowledge from electrical engineering and computer science focusing on communications networks and systems, encoding theory, information/optical processing and transmission. The aim of the program is to provide an academic education and prepare students for further studies at the Master's level.

Dulay, Bust and Krashen (1982) in their survey of major findings in second-language research indicate that the most beneficial environment for the learner is one which encourages language learning in natural surroundings for genuine communication. Furthermore, it has been shown that optimal second-language learning takes place in an environment:

- Which is non-threatening, in which the learner feels free to take chances and make mistakes;
- Which is linguistically and non-linguistically diverse – no grammatically sequenced syllables, no attempt to homogenize the environment so that learners understand everything;
- In which learners focus on tasks and activities of interest to them, and use language as a tool to get things done – very little explicit discussion of language;
- In which learners' interests and needs serve as the basis for learning activities;
- In which learners' talk is considered to be the task as in “being on task”: small talk, jive, and tall tales are not only tolerated, they are encouraged, and not just at “sharing time” but throughout the day.

The author argues that motivation is a powerful force in second-language learning. Motivation governs a need to communicate, to make friends, to identify with a social group, to become part of a community and to begin to plan one's future. Motivation becomes a positive force. Anxiety becomes an inhibitor. Self-confidence is very much related to second-language learning as is a low anxiety level and a tendency to be risk-takers and do guess work.

As the student becomes more secure in the second language, it is entirely likely that the native language precedes, to some extent. As vocabulary in the second language increases, words in the native language may well be forgotten. During the second-language learning process, a learner may insert words from each language in the same sentence. Again, this tendency demonstrates a motivation to speak the second language and is a way of permitting precise expressions which carry cultural content and can be stated in a given language.

Linguistically diverse students develop social language by being immersed in home country-speaking language environments surrounding everyday activities. These students can function in face-to-face social interaction but may lack language skills for learning academic content. The language of the classroom requires linguistically diverse students to use language that is conceptually demanding and cognitively complex. Unlike social language skills used to retell events, talk about experiences, describe activities, or give personal opinions, academic language requires the use of different forms of language to accomplish specific academic tasks (International Center for Leadership in Education, 2011, p. 26).

To become life-long language users, diverse students as well as native-Latvian speaking students need to gain control over language and feel comfortable about using the language. The ensuing principles for second-language instruction can help lecturer create supportive language environments:

- A. Latvian as a second language (LSL) learning should be built on the educational and personal experiences they bring to an educational establishment. In language learning, students should be encouraged to use their previous experiences with oral and written language to develop their second language and to promote their growth to

literacy. Students bring to educational establishment cultural identities, knowledge, and experiences that should be awarded by instructional practices rather than replaced or forgotten as learning takes place (Au and Jordon, 1981; Hudelson, 1986; Edelsky, 1986; Cummins, & Swain, 1986; Enright, & McCloskey, 1988; Cummins, 1986; Jordan, 1985; Diaz, & Moll, 1987). Socializing, learning, questioning, and wondering are some of the many things that one is able to do when one learns a language. However, these things are not quickly learned; it takes many years to develop full-fledged competence (Cummins, 1981; Wong-Fillmore, 1983; Collier, 1987). Furthermore, rates of development of oral proficiency vary considerably in LSL students. Consequently, lecturers, not just LSL specialists, need to address the learning needs of LSL students and adjust their instruction accordingly to meet the different levels of Latvian proficiency, different learning rates, and styles of their students. Instructional convenience does not mean, however, a “watered-down” curriculum.

- B. It has long been recognized that if LSL students are to ‘catch-up’ or ‘keep-up’ with their native-Latvian speaking peers, their cognitive and academic growth should continue while the second language is developing. Thematic units (as opposed to exercises in grammatical structures), where language is integrated with academic content, appears to be an effective way to simultaneously develop students’ language, subject area knowledge, and thinking skills. Thematic units help involve students in real language use – use of language interactively across a variety of situations, modes, and text types.

Machine translation technology is constantly being applied by linguistically diverse students in the study process, but a machine cannot assess whether a sentence sounds good or bad. A machine is also incapable of managing nuances, subtexts, symbolism or wordplay; it cannot control mood or tone. Thus, machines are not likely to replace human translators in near future.

Below there is a list of functionalities of a machine translator:

- Like a bilingual dictionary, it can match a word in one language with a word in another language. However, the same word may have different meanings. For example, “spirits” can be either souls or alcoholic drinks in English.
- When it has to choose between different possible translations, a machine translator can make statistical “guesses” at the context.

However, the problem with machine translation is that a machine is only a machine. It matches components and follows rules. It does not actually know what it is talking about. A machine cannot assess whether a sentence sounds good or bad. A machine is also incapable of managing nuances, subtexts, symbolism or wordplay; it cannot control mood or tone.

Aim of the research: To identify the problems and motivation factors for linguistically diverse 1st-year university students caused by quality of the machine translation.

Questions of the research:

- The use of machine translation in itself does not constitute an enhancement of the quality of teaching and learning, but it is a potential enabler for such enhancement;
- Evaluation of linguistically diverse 1st-year universities students’ work using online course management system motivates them to study;
- Use of traditional forms and e-learning opportunities for linguistically diverse 1st-year university students is necessary in similar proportions.

Research methods. As the theoretical framework, the following methods were applied:

- Feedback about application of on-line learning platform;
- Evaluation of all homework assignments uploaded in the e-learning environment;

- A survey with the assessment of the course “Entrepreneurship (Distance Learning e-course)”, developed by the author of this article.

3. Test bed

Web-based e-learning platforms allow educators to construct effective on-line learning study courses by uploading various categories of study materials. E-learning platform allows usage of a wide range of on-line learning tools as forums, discussion forums, e-mail messaging, as well as combining face-to-face and on-line approaches. The purpose of these technologies is: to deliver study materials to a student, improve students' skills, assess skills and knowledge, and achieve better learning outcomes. Fast and immediate feedback is possible. In e-learning platforms produce data logging. Logged data can be used for later analysis. There are two types of data:

- Data produced by students or teachers and represent the content of the learning course.
- Data made by the system based on student's activities like in system-spent time, kept sessions, the number of clicks on items of the content, etc . (Ratniece, Cakula, Kapenieks, & Zagorskis, 2015).

At RTU, e-learning platform MOODLE has been maintained. In the period from October until December of academic year 2013/2014, academic year 2014/2015 and the academic year 2015/2016 the course “Entrepreneurship (Distance Learning e-course)” for 1st-year students was provided. The course was conducted by RTU Professor A. Kapenieks. The author, as the Assistant to the Professor, supplemented the lecture content. Author's study, entitled “Use of Social microblogging to motivate young people NEETs – not in education, employment and training – to participate in distance education”, was presented.

4. Getting of the raw data

The research was carried out during the lectures and the final exam of a course "Entrepreneurship (Distance Learning e-course)" with the 1st year students participating on a voluntary basis.

Methods for diagnostics of the degree of risk preparedness, motivation to success and motivation to avoiding failures have been tested for all students three times during course: at the beginning, in the middle of course and at the end. Homework. The course had two homework assignments:

- “The Search of Business Ideas on the Internet”;
- “Your Business Idea”.

The author has evaluated all homework assignments uploaded in the e-learning environment. Reviews and comments were added, with the aim to encourage and motivate students to prepare their business plans in time and of good quality. Each comment was prepared according to the results of the content analysis. The feedback comments to students were written in a positive, supportive and motivational manner, personally addressing each student. The author has noted on students' written language mistakes. The assessment of the student's homework was done by the author concerning seven criteria:

1. Actuality or viability of idea;
2. Technological solution or how to enforce;
3. Marketing – promotion of goods or services in the market;
4. Competition;
5. Financial security (e.g., planned revenues, expenses, financial support for the company's start-up and ongoing development (bank loan, other resources, etc.);
6. The ability of a company to realize the idea;
7. The potential risks.

5. Results of feedback

Every year the Latvian and linguistically diverse students' success rate increases. Looking at the two groups of proportion, it is evident that linguistically diverse students total proportion increases, which have successfully completed a course "Entrepreneurship (Distance Learning e-course)" (Table 1).

Table 1. Latvian and linguistically diverse students' results over the 3 academic years.

Academic year	Students' two groups in relation to the language use	The number of students who started a course "Entrepreneurship (Distance Learning e-course)"		The second homework "Your business idea"		The teacher's comments according to the incorrect Latvian language use		The number of students, who successfully completed course	
		Every group	Total	Every group	Total	Every group	Total	Every group	Total
2013/ 2014	Latvians	80	142	62	84	3	21	77	107
	Linguistically diverse	62		22		18		30	
2014/ 2015	Latvians	78	142	43	80	2	13	53	79
	Linguistically diverse	64		37		11		26	
2015/ 2016	Latvians	77	132	32	64	0	4	32	56
	Linguistically diverse	55		33		4		24	
TOTAL		416		228		38		242	

Home works (uploaded in the e-learning environment) quality level of linguistically diverse 1st-year university students every next year became better concerning the use of machine translator.

Data relating to the second homework "Your business idea" of a course "Entrepreneurship (Distance Learning e-course)" shows the real-study example of machine translation, linguistically diverse 1st-year universities students took and used online translator on Google, to translate it to Latvian. Here are short examples of the resulting translation using Google translator (Table 2):

Table 2. Linguistically diverse 1st year university students' translations using machine translation (online translator on Google) in the period - academic years 2013/2014 and 2014/2013.

No.	Linguistically diverse 1st-year university students sentences or phrases in Russian language before a machine translation	The same phrase in Latvian and English using a machine translation	The same phrase in the correct Latvian and English	Comment
1	Ремесленные изделия (acad.year 2013/2014th)	Rokdarbu izgatavošana (<i>false</i>)	Rokdarbu produkcija, izstrādājumi (<i>true</i>)	Handcraft is a process and cannot be defined as object of production

		Handcraft producing (<i>false</i>)	Handcraft products (<i>true</i>)	
2	Расходы будут осуществляться при изготовлении устройства, регулировки датчиков и простого использования (acad.year 2013/2014th)	Izdevumi būs saistīti ar ierīces taisīšanu, sensoru regulēšanu un to izmantošanu visvieglāko (?) ...(<i>false</i>) Expenditure will be linkened to the making of device, sensors and regulation of the use of the easiest (?)...(<i>false</i>)	Izdevumi būs saistīti ar ierīces izgatavošanu, sensoru noregulēšanu un vienkāršu izmantošanu (<i>true</i>). Expenditure will be linked to the device producing, sensors regulation and for easy use (<i>true</i>).	Word order is illogical, so it seems that the sentence has not been completed.
3	Эта глобальная система управления и контроля поможет сократить время реагирования в условиях чрезвычайных (adjective in genitive) ситуаций (acad.year 2013/2014th)	Šis globālās kontroles un uzraudzības sistēmas radīšanas palīdzēs samazināt glābšanas dienesta reaģēšanas laiku ārkārtīgas (adjective) situācijas laikā (<i>false</i>). This global control and monitoring system will help reduce emergency response time in extreme situation (<i>true</i>).	Šī globālās kontroles un uzraudzības sistēmas izveide palīdzēs samazināt glābšanas dienesta reaģēšanas laiku ārkārtas (noun in genitive) situāciju brīžos (<i>true</i>). This global control and monitoring system will help reduce response time at the moment of situation of emergency (<i>true</i>).	In Latvian language in the role of adjective often is used noun in genitive : ārkārtas situācijas brīdī –at the moment of situation of emergency
4	Все, что необходимо для реализации идей, это стабильные средства, тщательное управление и доверчивый персонал (acad.year 2014/2015th)	Viss, kas ir vajadzīgs idejas realizēšanai, tas ir stabili fondi, rūpīga administrācija un lētīcīgs personāls (<i>false</i>). All that is necessary for the realization of ideas, is stable funds, careful administration and credulous staff (<i>false</i>).	Viss, kas ir nepieciešams idejas īstenošanai, tie ir stabili fondi, atbildīga administrācija un uzticams personāls (<i>true</i>). All that is necessary for the realization of ideas, are stable funds, careful administration and reliable staff (<i>true</i>).	The adjective “доверчивый” – “lētīcīgs” – “credulous” is derived from the verb “доверять” – “uzticēties” – “to rely”. In Russian audience the adjective “доверчивый” often is used in the content “trust”, but machine translator Google gives only one option of “доверчивый” in Latvian language – “lētīcīgs” - credulous

5	Вам необходимо скачать программу на телефон (acad.year 2014/2015th)	Jums nepieciešams šūpot programmu uz telefona (<i>false</i>). You need to rock (to swing) a program to the phone (<i>false</i>).	Jums nepieciešams lejuplādēt programmu telefonā (<i>true</i>). You need to download a program to the phone (<i>true</i>).	The verb's "скачать" – "lejuplādēt", "download" meaning differs absolutely comparing to the verb "качать" - "šūpot" - "to rock". Meaning differs due the prefix "c".
6.	Деньги группы людей – Kickstarter (acad.year 2014/2015th)	Pūļa finansējums – Kickstarter (<i>false</i>) Crowd Funding – Kickstarter (<i>false</i>)	Ļaušu grupas nauda – Kickstarter (<i>true</i>) Folk money – Kickstarter (<i>true</i>)	Crowd or folks means groups of people. Kickstarter is a funding platform for creative projects. Backers are folks who pledge money to join creators in bringing projects to life. The noun "crowd" in Latvian language is translated with a little bit negative meaning - throng, multitude, rabble, ruck

Table 3. Students' evaluation of the effectiveness of the form practiced in the course "Entrepreneurship (Distance learning course)" (academic years 2013/2014th and 2014/2015th).

Form of study	Low rating			Average rating				High rating			Weighted Mean
	1	2	3	4	5	6	7	8	9	10	
1. Lectures 2013/2014				3	6	16	34	29	11	6	7,30
2. Lectures 2014/2015	1	1	2	1	1	10	25	18	12	8	7,80
3. Discussions 2013/2014			2	3	5	13	18	35	21	8	7,73
4. Discussions 2014/2015		1	1	1	1	3	13	24	18	17	8,40
5. Insertion in ORTUS 2013/14			1		7	11	19	35	15	17	7,90
6. Insertion in ORTUS 2014/15			1	3	4	5	15	20	15	16	8,01
7. Teachers' comments 2013/14			1	2	7	12	15	33	17	18	7,88
8. Teachers' comments 2014/2015	1		1	2	4	4	9	14	12	31	8,54

Latvian and linguistically diverse 1st year university students very carefully evaluated negative and positive aspects of both methods based on their personal experience, and were able to provide an objective feedback in regard to what situations required a direct contact with teacher, and when e-learning was the best and most efficient learning option. That is reflected in the questionnaires that were submitted at the end of semester. All respondents indicate that

e-learning and traditional forms of study need to be kept in balance, because e-learning provides a great advantage to learn anywhere, anytime. A successful guidance through the study process, however, is just as important, and can only be ensured when a teacher is present.

The topic concerning linguistically diverse 1st year university student translations using machine translation - online translator on Google is included in the table 3 (see the points – 5, 6, 7, 8).

It should be noted that in the academic year 2013/2014 teacher comments on-line environment (including the correct use of the Latvian language) were written in assessing students' second home work.

In the academic year 2014/2015 teacher comments on-line environment were written in assessing students' first and second home work. In the academic year 2015/2016 teacher comments on-line environment were written in assessing students' first home work.

Students' average assessment shows that students appreciated the teacher's job better when the teacher had evaluated both homework assignments.

Conclusions

A course "Entrepreneurship (Distance Learning e-course)" can be used as the spectrometer which helps to identify and solve the 1st year student education quality problems and increase learning motivation at Universities. Most students, including linguistically diverse students, consider that E-learning and traditional forms of study need to be kept in balance, because e-learning provides a great advantage to learn anywhere, anytime.

Machine translation technology is constantly being applied by linguistically diverse students in the study process, but a machine cannot assess whether a sentence sounds good or bad. A successful guidance through the study process, however, is just as important, and can only be ensured when a teacher is present. 1st year student motivation is needed by connecting with student interests, experience and aspirations. Linguistically diverse student's homework evaluation of the on-line environment improves students' knowledge, as well as learning the language, if the teacher points to the grammatical errors resulting from the use of machine translation.

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