Could lack of intrinsic motivation be a reason for the plagiarism of Russian IT-students?

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Abstract. Today we could admit the growing demand for high educated experts, but modern technologies provide not only new learning opportunities, but also an enormous amount of Web-resources to plagiarize. In this paper we discuss role of intrinsic motivation on attitude towards plagiarism on the base of a results received during a project "A cross-cultural study of a new learning culture in Germany and in Russia". Analysis showed absence of significant differences in intrinsic motivation of German and Russian IT students and significantly more tolerance of Russian students to plagiarism. We presented analysis of reasons for plagiarism and probable ways to solve with this problem in the educational practices.

Keywords: intrinsic motivation, plagiarism, cross-cultural research, education, IT-students, attitudes

1 Introduction

Internet and ICT changes shape of modern education by increasing availability of texts, images, videos, and other types of learning resources. Shared knowledge and possibilities provided by many authors allows students to learn in more self-determinated and self-regulated way. Unfortunately, our students use his opportunities not only for learning, but also for cheating. With increasing access to information, increases also a problem of plagiarism. Even plagiarism detection software or services could not guarantee plagiarism free academic space. Also psychologists are concern about punishment as best solution for prevention of plagiarism.

In Russia plagiarism detection service become widely used since 2007, but in 2009 Voiskounsky reported that 11.7% of Russian students plagiarize more than once in a month (the 12-item questionnaire designed by Szabo and Underwood was used). Voiskounsky argued that technical competences of students are higher than their tutors and some of them plagiarize because they know that their tutors would not be able to catch them.

In 2008-2009 in collaboration with Hartmut Giest we conducted a cross-cultural study on learning motivation [18,19]. Results of Voiskounsky and possibility to analyze data collected from IT-students in Germany and in Russia, lead us to a question could plagiarism be connected not only with IT-competence, but also with lack of intrinsic motivation? How motivation determine students' attitude towards plagiarism?

We think answer to our question could help in better understanding plagiarism and provide some ideas about how to avoid this problem and help our students learn more efficiently.

2 Theoretical framework

2.1 Role of intrinsic motivation.

Analysis of plagiarism as culture phenomena we made in a theoretical framework of cultural-historical psychology approach of L.S.Vygotsky and activity theory of A.N.Leontiev. From our theoretical perspective the main factors influence attitude to plagiarism are existing models of plagiarism in society and motivation to plagiarize. Studying students attitudes to plagiarism Voiskounsky found that Russian students have rather few moral barriers towards plagiarizing, believe that most of their mates do the same and not sure their tutors are able or willing to recognize cheating [21]. This led us to conclude that in Russian universities students could observe practices of plagiarism.

Motivation is considered by many scientists as a driving force that organizes and directs an individual's actions, behavior and cognitive processes, which are all strongly influenced by different patterns of motivation [3, 6, 8, 9, 11, 13, 15, 16].

There are many different theoretical approaches to explain the motivation process, for example, Achievement Goal Theory [2, 3, 9, 10, 15, 16, 21] and Self-Determination Theory [5, 6]. Contemporary motivation researchers agreed that human action is motivated by two main orientations: intrinsic (mastery or task orientation) and extrinsic (rewards, punishment avoidance or socially focused orientation).

For example, Deci writes about this distinction: "intrinsically motivated behaviors are ones for which there is no apparent reward except the activity itself" [5]. The educational studies show that intrinsic motivation is tightly connected with students' interest and development.

It is worth mention that motivation can be more or less volatile and more or less dependent on the situation. In case of stable motivation, we can speak about a person's motivational traits. According to Kanfer and Heggestad, "motivational traits were defined as stable, trans-situational individual differences in preferences related to approach and avoidance of goal-directed effort expenditures" [11].

In contemporary motivation research and in activity theory there is no major contradiction, as intrinsic motivation regarded by motivation approaches as orientation to mastery or task, and as it does in activity theory.

In activity theory, activity regarded as group of actions the completion of which satisfies the initial motive. “An activity and all the component actions are always realized in specific contexts which determine to a large extent the conditions under which the actions can be realized and the initial motive can be satisfied (e.g. availability of tools)” [12]. In our research we are focused on a learning context. Regular realization of activity leads to establishing of personal learning traits and personal learning motivational traits, which we analyzed in our paper.

2.2 Problem statement

Plagiarism draws attention of academics in many countries and after a decade of investigations it becomes clear that this problem is strongly connected with history and educational culture of particular country [20].

In Asia and post-Soviet countries students, due of different traditions and understanding of term intellectual property, are more tolerant in evaluation of plagiarism act. Although picture is not simple, for example, in Japan students do not accept plagiarism as often been suggested and their knowledge about this act have serious impact on their behavior [23].

Although, plagiarism is as a serious academic offence in many countries including Russia, the attitudes to plagiarize, learning motivation and models students observe in University are different.

Regarding factors of students’ plagiarism Voiskounsky draws attention to the fact that tutors are not able or not willing to recognize cheating and this could support the plagiarism [21]. Especially it is true for IT-students, who demonstrate outstanding mastery in information and communication technologies and usage of internet. Although, it is true for extrinsic motivated students, but may be intrinsic motivated students behave in a different way? How motivation as driving engine of our behavior influence students’ decision between two opportunities posited by D`anielle DeVoss and Annette C. Rosati: “doing critical, thoughtful, thorough research” or “searching for papers to plagiarize” [7, p. 201]?

In this paper, following Voiskounsky, we regarded that academic plagiarism is “related to taking ready-made pieces from the Internet and inserting these pieces into one’s assignment and/or presenting a whole piece as a homework” [21, p.566].

Purpose of our work is to analysis of learning motivation and attitudes toward plagiarism of Russian IT-students. Cross-cultural analysis of intrinsic motivation allows us to compare level of intrinsic motivation of Russian IT-students with German IT-students and answer main question could be lack of intrinsic motivation be responsible for plagiarism in Russia.

3 Procedures

In our research we use data collected at 8 Universities in Germany (332 participants) and 18 Universities in Russia (865 participants) during the project "A Cross-cultural study of a new learning culture formation in Germany and Russia"[18, 19]. In both samples, all respondents had completed at least 3 years of university-level study. The selection of the universities was dictated by the intention to make the samples as comparable as possible.

In our project we used modified intrinsic scale of Motivated Strategies for Learning Questionnaire (MSLQ) study intrinsic motivation [17]. We should mention that MSLQ was designed to assess college students' motivational orientations and learning strategies for a particular college course [17], but in our study we wanted to measure motivation traits (intrinsic motivation, extrinsic motivation, and test anxiety), so the items of MSLQ were modified in accordance with the objectives.

For example:

Intrinsic orientation scale:

Original item from MLSQ: "In a class like this, I prefer course material that really challenges me so I can learn new things." was changed into: "I prefer course material that really challenges me so I can learn new things."

All questions from the test anxiety scale remained without modifications, for example: (original item from MSLQ) "When I take a test I think about how poorly I am doing compared with other students."

To study performance-avoidance orientation (not exist in MSLQ) we decided to add three questions to investigate this trait. For example, we add item "If I know that I could find a solution to the tasks on the Internet or my group mates could give it to me, I will not do it by myself."

To establish cross-cultural invariance we followed standard procedures: exploratory (EFA) and confirmatory factor analysis (CFA). For the EFA the sample of Russian students was randomly divided into two subsamples "A" and "B" (subsamples tested to have no significant differences at all controlled variables with $\chi 2$- criteria); at the Russian subsample "A", Principal Axis method with Oblimin rotation was performed; EFA model was compared with the expected theoretical model (items to scale distribution); next we tested the EFA model on Russian subsample "B" and German sample. CFA was used to test measurement invariance, first we used covariance analysis (COVS) and second mean and covariance (MACS) simultaneous multigroup analysis [4, 14]. For detailed description see Porshnev A., Giest H., Sircova A. (in press). The analysis showed structure and measurement invariance of scales and absence of sig-nificant differences at the mean of intrinsic orientation factor scale (see Figure 1).

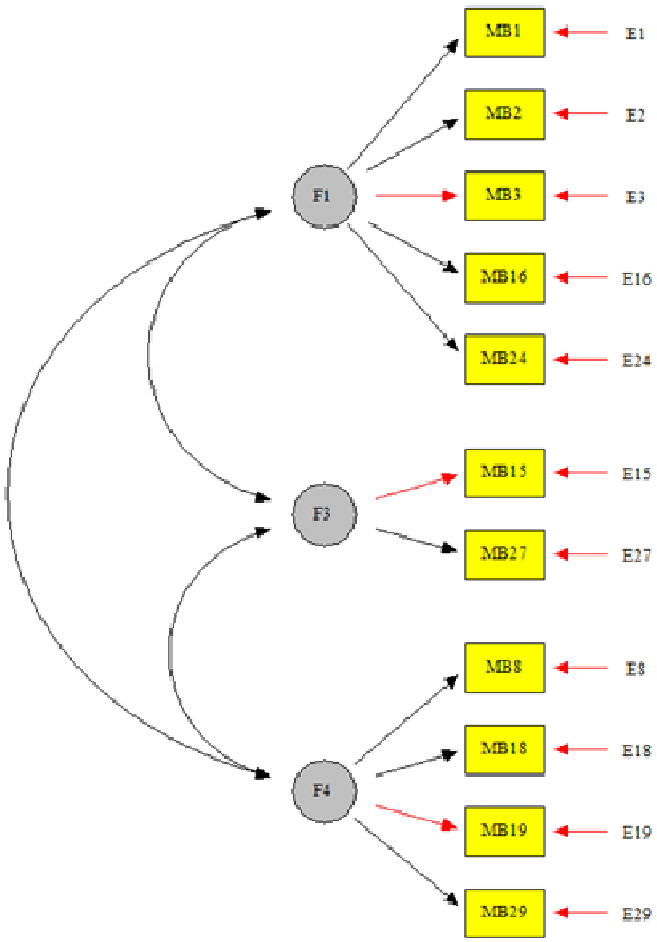

Figure 1: Hypothesized model of factorial structure for three scales F1-intrinsic orientation, F3-performance avoidance, F4-test anxiety.

To check stability of the measured traits we need analyze restest validity of proposed instrument. After a half-year from first stage (organized in October-December), we conducted second stage (in July-August). We ask participants (who let us to use their e-mails) to answer our questions again (we use only learning motivational traits items, other questions were not asked, to minimize drop rate). 228 students from Russia 228 and 55 from Germany participated in both stages of our research. Coding emails allowed us to merge data and join answers of participants from the first and second stages.

Pearson correlation coefficients correlation between first stage and second stage values of scales are high and significant ($p<0.01$). Extrinsic orientation

showed lower correlation coefficients: 0.651 (Russian sample) and 0.682 (German sample). Intrinsic orientations, test anxiety and performance-avoidance demonstrated correlations higher than 0.7 on both samples.

To study students' attitudes towards plagiarism we use two questions: mb28 "I copy and paste to my work a few paragraphs from a book/internet uncited", mb6 "My group mates copying a few paragraphs from a book/internet to their work uncited."

In our research we also add questions about their behavior. For the question "What for you use Internet and computer yesterday" and ask respondent to mark one or more categories from following list:

1. Fun & Games
2. Communicate in social networks or forums about general topics (Facebook, students' forums etc.)
3. Communicate with Skype, email and etc.
4. Search and download images, ring tones and games for your phone
5. Do computing
6. Edit texts and presentations, including creation of charts and diagrams
7. Edit images and photos
8. Read blogs
9. Read handbooks or other materials (articles from Wiki, presentations, essays etc.)
10. Read scientific articles, books etc.
11. Look for information about health or healthy life online
12. Read news
13. Rest and relax
14. Look online for news or information about politics or political campaigns
15. Shopping
16. Looking for information about something else, didn't mention above

For analysis of IT-students' attitudes we filtered data by specialization: as the result we received subsample of 78 German students and 216 Russian students from IT-related faculties.

According to the question mb28 about attitudes towards plagiarism we observe that Russian students are significantly more tolerate to it than German students ($\chi 2$, $p<0.001$, Fig.2,3). The attitudes towards plagiarism had no significant differences between male and female students ($\chi 2$, $p<0.05$). Age of students also has no influence on attitudes towards plagiarism ($\chi 2$, $p<0.05$).

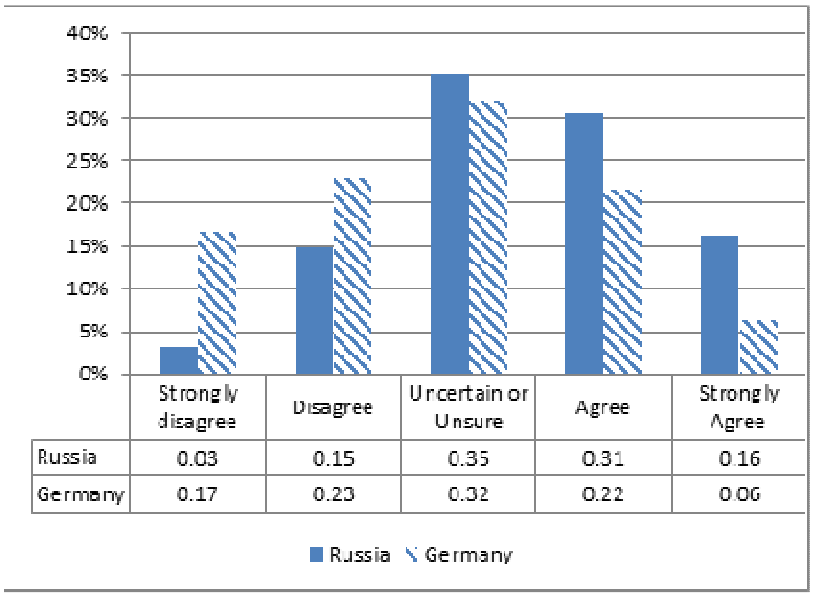

Figure 2: Russian and German students' attitudes towards plagiarism question mb6 "My group mates copying a few paragraphs from a book/internet to their work uncited."

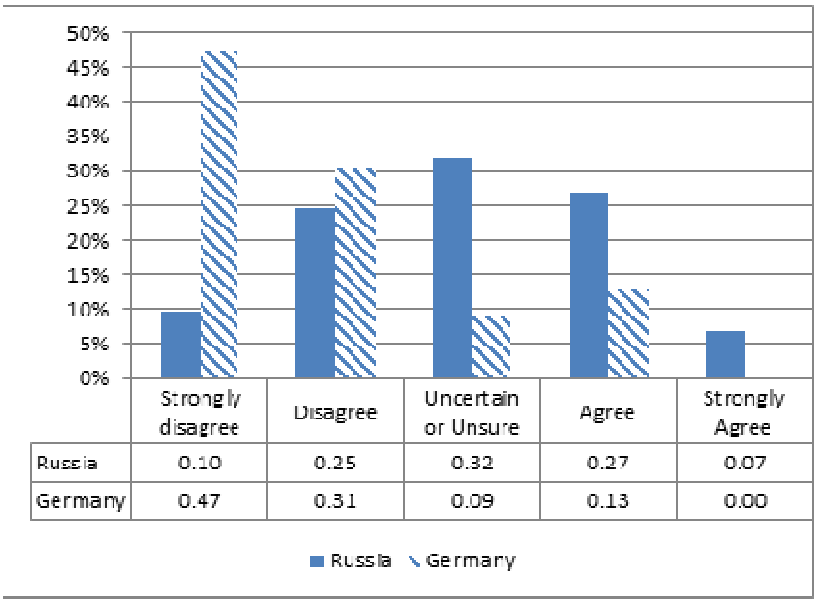

Figure 3: Russian and German students' attitudes towards plagiarism question mb28: "I copy and paste to my work a few paragraphs from a book/internet uncited"

Analysis of IT-students subsample, demonstrated that in Russia (M=0.89, SD=0.3) they are more intrinsically motivated than in Germany (M=0.77, SD=0.29) (t-test, $p<0.05$).

These both facts about intrinsic motivation and attitudes to plagiarism lead us to conclude that factor of educational culture and particular educational practices plays greater role than motivation on students decision how to prepare their assignments. Our main hypothesis that only lack of intrinsic motivation leads to use of plagiarism could not be accepted.

We continue analysis of students' motivation to found correlation between attitudes towards plagiarism. At the table 1 you could see Pearson correlation between motivation scales and question mb28 "I copy and paste to my work a few paragraphs from a book/internet uncited" at Russian and German subsamples of IT-students.

Correlation analysis made with Pearson criteria showed differences between Russian and German IT-students (see Table 1). At German sample we found no significant correlations. This could be explained by influence of culture factor – as 78% of respondents answers that they are not agree to copy and paste from Internet uncited. Effect of motivation comes next then students do not follow common in German education model, to find this we could look at whole German sample (426 respondents). Analysis of correlation on German sample showed tendency in influence of motivation are almost universal. In both countries tolerance to plagiarism correlate negatively with intrinsic motivation and positively with test anxiety, and activity avoidance scales. Interesting to mention that extrinsic motivation on both samples had no significant correlation with attitude to plagiarism.

Table 1: Correlation between motivation scales and attitude towards plagiarism at Russian and German sample

Russian IT-students subsample	(N=216)	INT	EXT	AVO	TA
mb28 "I copy and paste to my work a few paragraphs from a book/internet uncited"	Pearson Correlation	-.175**	.072	.289**	.238**
	Sig. (2-tailed)	.010	.289	.000	.000
German IT-students subsample	(N=78)	INT	EXT	AVO	TA
mb28 "I copy and paste to my work a few paragraphs from a book/internet uncited"	Pearson Correlation	-.185	.003	.180	.204
	Sig. (2-tailed)	.105	.976	.115	.073
German sample	(N=426)	INT	EXT	AVO	TA
mb28 "I copy and paste to my work a few paragraphs from a book/internet uncited"	Pearson Correlation	-,133**	-,019	,247**	,166**
	Sig. (2-tailed)	,006	,693	,000	,001

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Although, correlation of attitude to plagiarize and intrinsic motivation is negative and significant, it is less than 0.2, which is low correlation. We could conclude than only avoidance orientation of students plays significant role on students' attitude to plagiarize.

Another hypothesis we could check about IT students is interconnection of plagiarism tolerance and usual behavior. Could we expect that plagiarism associated with playing computer games (as common stereotype)?

For this we could use answers of students to our question: What for did you use computer and Internet yesterday? (with 16 categories possible to select, from v11.1 to v11.16). To run this analysis we decide to use association rules algorithm proposed by Agrawal R., Imielinski T., Swami A. [1]. Answers to questions v11.1 to v11.16 was binomial: "Yes, I did" (true), "No I didn't" (false). We recalculate answers to question mb28 with following formula:

$$\_mb18 = \begin{cases} true\ , if\ mb18 > 3 \\ false, if\ mb18 \leq 3 \end{cases} \quad (1)$$

Following the original definition provided by Agrawal et al. [1] we define the association rule as: let M= {m_1,m_2,…m_k } , be a set of k binary attributes called items (in our case they indicate categories of computer and Internet usage), set G= {g_1,g_2,…g_n } where gi – each content a subset of the items from M.

A rule is implication of the form A→B, there A,B belong to M and A∩B=ø.

Let define also function Count, where Count(G, A) amount of items from G which have A in their subset. For example Count(G, M) = n

To find most important association rules we have to calculate support and confidence.

In our case support will be a number of IT-students answered that they use computer or Internet yesterday for purposes A and B, divided by number of all persons from containing the items.

$$Supp(A \rightarrow B) = \frac{Count\ (G,AUB)}{Count\ (G,M)}, \quad (2)$$

Confidence is number of person answered that they use computer or Internet yesterday for purposes A and B, divided by number of persons from used computer and Internet for purpose B.

$$Conf(A \rightarrow B) = \frac{Count\ (G,AUB)}{Count\ (G,\mathrm{A})} \quad (3)$$

Using this association rules we could found which of students behavior associated with plagiarism. We establish following thresholds 0.4 for support, and 0.6 for confidence.

For our data we found following association rules for mb28 (as consequent Y):

V11 →mb28 (Support=.65, Confidence=0.65)

V11 – main question – "Did you use computer and Internet yesterday?"

And we could see that rule v11→mb28 have biggest support and confident association with question "I copy and paste from Internet uncited). Although, this is most common category which consist from 91.7% of respondents

V11.2 →mb28 (Support=.48, Confidence=0.65)

Category 2 - Communicate in social networks or forums about general topics (Facebook, students' forums etc.). Category 2 also contains more than half respondents – 73.6%

V11.9 →mb28 (Support=.46, Confidence=0.64)

Category 9 - Read handbooks or other materials (articles from Wiki, presentations, essays etc.). 71.3% of students answered that they read handbook yesterday. Interesting that next category (10 Read scientific articles, books etc.) had no associations with mb28.

We could see that plagiarize is common phenomena among Russia students, all common behavior like to communicate or use Wikis associated with plagiarism. But what be confidence for the categories, for example how many students from students played yesterday are agree that they plagiarize?

For v1 (Fun & Games) → mb28, confidence= 0.64, so we could not say that games are highly associated. The higher confidence 0.69 was demonstrated by v12 (Read news).

5 Conclusion

IT students in Russia are more tolerant to plagiarism, but why we thought that lack of intrinsic motivation could be a reason for this phenomenon. Fortunately we did not observe it our study. Usage of cross-cultural data allowed us to compare intrinsic motivation in Germany and in Russia. Analysis showed that, in spite of different attitudes towards plagiarism Russian and German, IT-students in Germany have significantly lower level of intrinsic motivation.

Although, attitudes towards plagiarism correlated negatively with intrinsic motivation, the bigger correlation was found for task avoidance orientation as motivational trait, responsible for activity of person in non-controlled cases. This means idea of Voiskounsky that reaction from tutors make greater impact on students, is closer to be true. Thinking about roots of higher task avoidance of Russian IT - students we could hypotheses that low level of self-determination in Russian educational system lead to higher avoidance of tasks by students.

During analysis we found no evidence for stereotype that usage of computer games as a more common among plagiators, as well as we didn't found a other category of computer usage associate with plagiarism with high confidence.

We have to draw attention to the limitation of our research as data were collected in 2008-2009 and modern situation with plagiarism could be differ from analysed in our paper as many attempts in Russian universities are made to solve this problem. This provide also important direction for further monitoring attitude towards plagiarism in Russian universities.

We could suppose that intrinsic motivation influence not directly, but intermediated by common behavioural patterns, and traditions. Although, we think further research could investigate role of transparency and clearness of instructions provided by tutor and knowledge about plagiarism act and its consequences. Investigation of role of these factors would be direction for our further work.

It could be also suggested to study impact of e-portfolios, several drafts work or usage of learning contracts on students' attitudes toward plagiarism. All these practices could increase transparency of learning process and allow better understanding for students.

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