Study of use and perception of Internet information by young people with a field-dependent/field-independent cognitive style for decision making for sustainable development

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Abstract. The purpose of our study was to learn the peculiarities of students' information perception and behavior in the Internet with dependent and non-dependent cognitive styles. The sample consists of 120 students. We used the techniques: "Gottschaldt's figures", "Strategies of information behavior", the technique of unfinished sentences that determined the attitude of respondents to the Internet. The Mann-Whitney difference criterion was applied. As a result, we identified field-independent students, for whom the Internet serves the purposes of communication, carries a positive charge and increases the circle of communication. Such students are characterized by a rejection of rudeness, of disrespect in information content and the value of protection, privacy. Field-dependent respondents note the accessibility, quick obtaining information and they have a pronounced search and peeping type of behavior in the Internet. For the field-dependent respondents, Internet information is used for entertainment, shopping. They note the overload of Internet content with Internet-content advertising, the drawn out communication and the fact that information is rather unreliable. Self-dependent respondents are more likely to show motivating informational behavior. Conclusions based on the results of the study are concentrated around the possibilities of using style characteristics in improving the effectiveness of student learning.

1 Introduction

Problems of cognitive style (field-dependence and field-independence) are actively studied in the context of information technology education [1-5]. If we consider the process of cognition as a whole, then, according to Kholodnaya, field-dependence and field-independence are cognitive styles of information processing by a person [6]. The field dependents are tied to contexts and backgrounds. The field independents direct their attention to the figure, the object to a greater extent. The knowledge that was obtained earlier regarding the personal characteristics of respondents with field-dependent and field-independent cognitive styles is successfully extrapolated to the problems of information behavior. If field-independent subjects belong to rational types, they are purposeful, active and adaptive, they

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form a positive system of basic beliefs, and they are more capable of activities self-organizing and are more likely to experience a sense of psychological well-being. On the contrary, if the field-dependent subjects belong to irrational types and they are not characterized by purposefulness, they are less active and less adaptive, it is difficult for them to organize themselves, their system of basic beliefs tends to be negative, and they are less likely to experience a sense of psychological well-being [2]. It is statistically confirmed that extroversion contributes to an accurate understanding of the threat, and the psychotic factor contributes to an accurate perception of the threat of loss of reputation compared to threats to health or social status [7]. Based on studies [8], which tried to determine whether the performance of the standard task of assessing the cognitive style of field-dependence or field-independence is a function of the relationship with extroversion and psychoticism, it was shown that such a relationship occurs, but only in a group of young people and both non-impulsive and aspiring to high feelings of participants characterized as field-independent ones. It can be assumed that field-independent respondents will subtly feel the changes in the attitudes of others towards them in Internet communication. This can also affect the solution of problems. The study [9] established a link between field-dependence-field-independence and factor g and more effective problem-solving strategies [10]. Participants who rated themselves higher in perspective perception and who were identified as more field-independent showed more evidence of repeated communication with a partner [11]. Field-independent students outperformed field-dependent students in terms of the effectiveness of task solving and interaction with a computer tool. Students who did not interact well with the software, were not sure how to systematically use the capabilities of a computer tool to solve a problem, did not have a purposeful plan or strategy for how to investigate the issue, and had difficulty testing by properly controlling variables in order to collect data to make informed decisions [12]. If we turn to the cognitive processes of cognitive style bearers, the field-independent respondents are likely to be more structured, determine the main thing in the material, and grasp the context quickly [4]. The field-dependent respondents will be guided by the field, with particular difficulties distinguish the context, show impulsivity.

Summarizing these ideas, it can be concluded that the observed differences in the field-dependent and field-independent respondents are significant. We would like to establish differences in the use, perception and behavior in the Internet in these groups.

2 Materials and Methods

Our study involved 120 respondents aged between 18 and 20 years, 42% male and 58% female. The students live in Elista. We divided the group of respondents according to the criterion of cognitive style (field-dependent and field-independent), using the method of "Gottschaldt Figures" [13]. During the study, the subject is presented with 5 simple figures in the upper part of the sheet, and complex figures in the lower part (15 figures on each of the two sheets). The subject had to find and indicate in the protocol for each complex figure the simple figure that is included in it as an integral part. With the help of the definition of cognitive style, it is possible to determine how much a person is guided by his own abilities and skills when making decisions, or how much he relies on external reference points [6, 14, 15]. Information behavior was measured by the methodology of the "Strategy of information behavior" (Abakumova, Romek, Kolenova, Grishina and Zvezdina) [16]. A strategy is understood as a plan, steps to achieve goals in the information space. The authors identified 10 strategies: personal, consumer, informational, hedonistic, motivating, alternative search, community involvement, peeping, sexual pleasure search, self-presentation.

The methodology of unfinished sentences determines the attitude of respondents to the Internet. The methodology of unfinished sentences was built with the inclusion of several aspects of the use and perception of the Internet: the dignity of the Internet as a tool; the

closeness and openness of user information; the embeddedness of the Internet in our lives; Internet needs; communication on the Internet; Information on the Internet; the personal meaning of the Internet; mass media on the Internet; the Frequency of Internet visits; the choice of sites; annoying moments on the Internet. This breadth of aspects allows you to recreate a complete picture of interaction with the Internet. The significance of the differences was determined by the Mann-Whitney statistical criterion. We put forward Hypothesis H: it is possible to determine the significance of differences in the perception of information on the Internet and the information behavior of students with different cognitive styles.

3 Results

As a result of our study, 30 people were identified as field-independent, and 90 people were identified as field-dependent. Next, it was necessary to establish the attitude to the Internet among respondents with different cognitive styles. We did it using the methodology of incomplete sentences and then analyzed the results. The sentence was finished with the following words, which are shown in Figure 1.

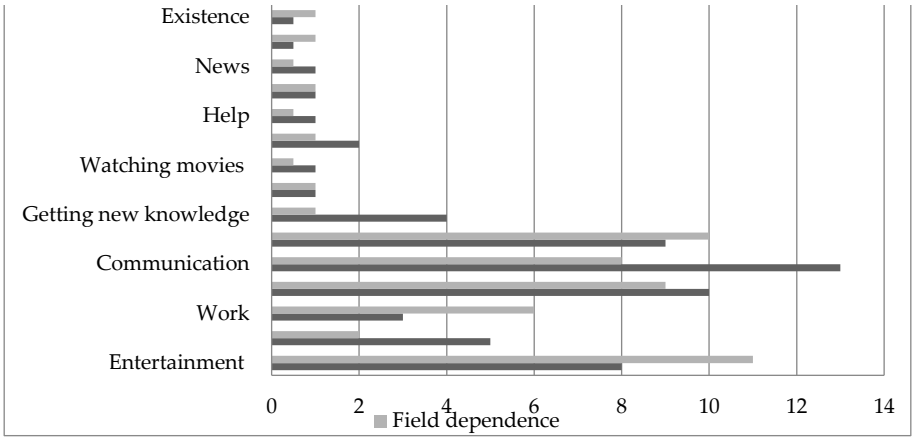

Fig. 1. Choices of the unfinished sentence "The Internet is needed for..."

The hidden content of this sentence is related to the needs of respondents on the Internet. The figure shows that the predominant choice is the position – communication (U=849; p=0.001) and development (U=572.2; p=0.001) in the group of field–independent and the position - entertainment (U=661; p=0.001) in the group of field-dependent. The Internet is a means of communication and this is clearly indicated by the field-independent respondents. At the same time, both groups define study and finding information as a priority. It can be explained by the fact that the respondents are students.

The completion of the sentence "I find it annoying on the Internet..." can be contrasted with these choices of respondents (Figure 2).

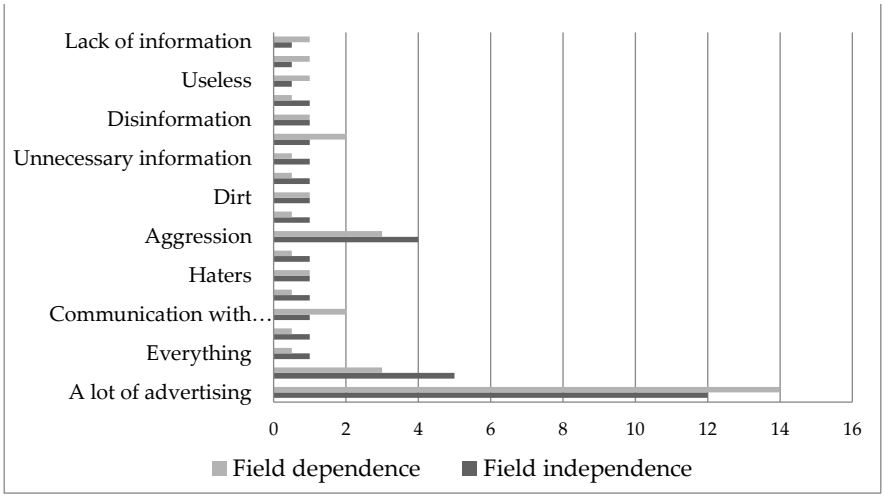

Fig. 2. Choices of the unfinished sentence "I find it annoying on the Internet..."

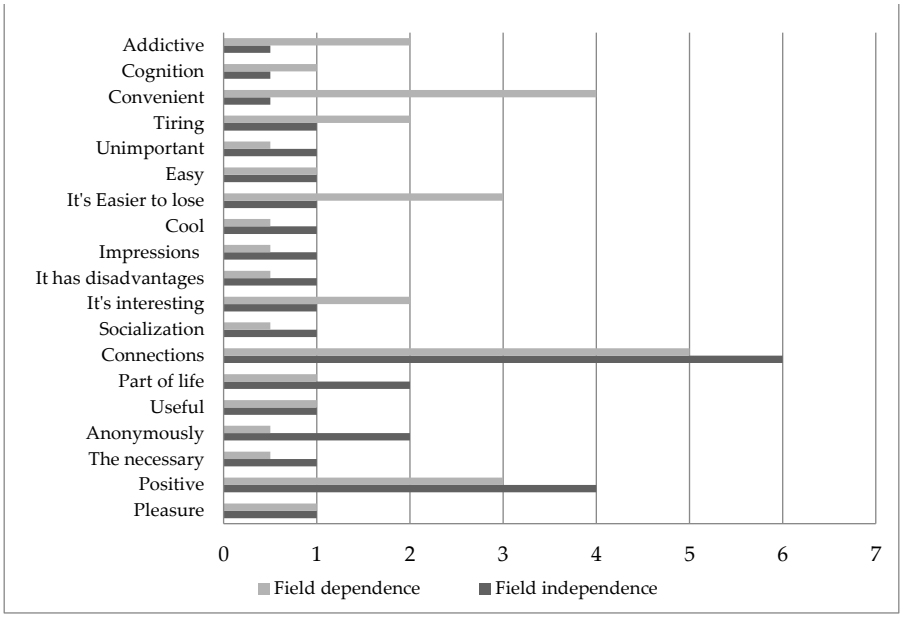

Fig. 3. Choices of the unfinished sentence "Communication on the Internet..."

In the first positions in both groups there is a problem of overloading the Internet with advertising (with a predominance in the group of field-dependent - U=694; p=0.001). It is noteworthy that the second position is occupied by "nothing", which may indicate some indifference to the Internet, the attitude towards it is simply as a tool. And in the third position is aggression, swearing, insults received from the Internet, with a predominance in the group of field-independent (U=385; p=0.003). To this, you can also add such answers of respondents as - "permissiveness, haters, communication with certain types, cynicism, nationalism, dirt, the opinion of others." Thus, the space of negativity occupies a very large place in the aspect of communication. This is very important, because in the previous measurement it was found out that the Internet is mainly used for communication. The

appearance of generalizing words "everything, nothing" in the responses of respondents may indicate hidden information that has remained closed to us.

If we delve into the ideas of communication on the Internet, we can see the following result obtained for the unfinished phrase "Communication on the Internet is ...", presented in Figure. 3.

For a group with a field-independent cognitive style, "establishing connections" is most preferable in Internet communication (U=826; p=0.004), as well as for a group of field-dependent. That means that there is a need to expand the circle of communication. Internet communication is described by field-independents as "positive" (U=793; p=0.002), "part of life" and "anonymous".

In the group of field-dependent people, the second position in importance is occupied by the answer "Communication on the Internet is convenient". I speaks about the pragmatism of the approach to the Internet. The field-dependent respondents emphasize that Internet communication is less important than live communication, but it is also "positive" for them. At the same time, self-dependent respondents write that Internet communication is "interesting", but "tiring" and "addictive".

Let's turn to the content of information on the Internet for respondents. The unfinished sentence "Information on the Internet..." was completed by the respondents as follows (Figure 4). All respondents primarily note the importance of information "unreliability" on the Internet. This factor seems alarming. Information on the Internet in many cases is not subject to any control due to its multiplicity. There are big risks hidden in this. For the field-dependent respondents who are strongly focused on the field of perception, this factor is a big hindrance and a subject of disappointment. Field-independent respondents, due to their constitutional analyticity, are annoyed at the inaccuracy of information. Field-independent respondents determine by 50% the "reliability", "usefulness", "easy accessibility" of Internet information. They note that "constantly updated", "cool", "always there" and that it is dangerous and should not be abused.

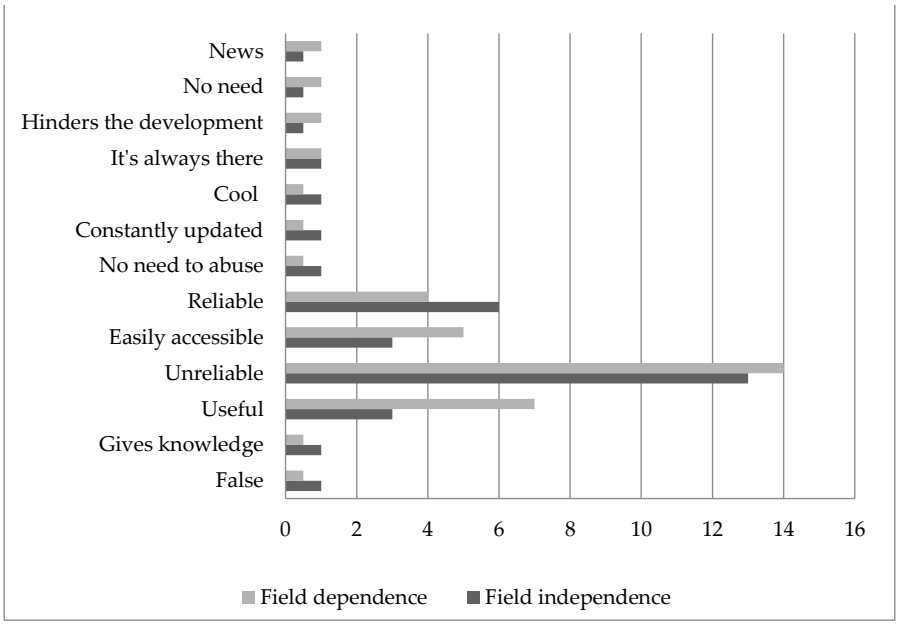

Fig. 4. Choices of the unfinished sentence "Information on the Internet..."

Field-dependent respondents believe less in the "reliability" of information on the Internet, but more that it is "useful", "easily accessible" (U=844; p=0.001). At the same time,

some respondents note that information is "always there", "not needed", "hinders development".

If we turn to the personal meanings of respondents connected with the Internet, the following results were obtained (Figure 5, 6).

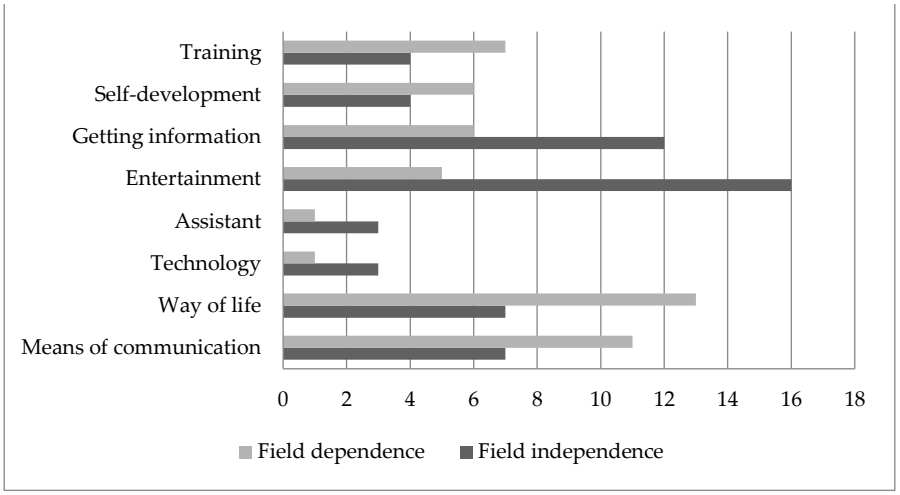

Fig. 5. Choices of the unfinished sentence "Internet for me..."

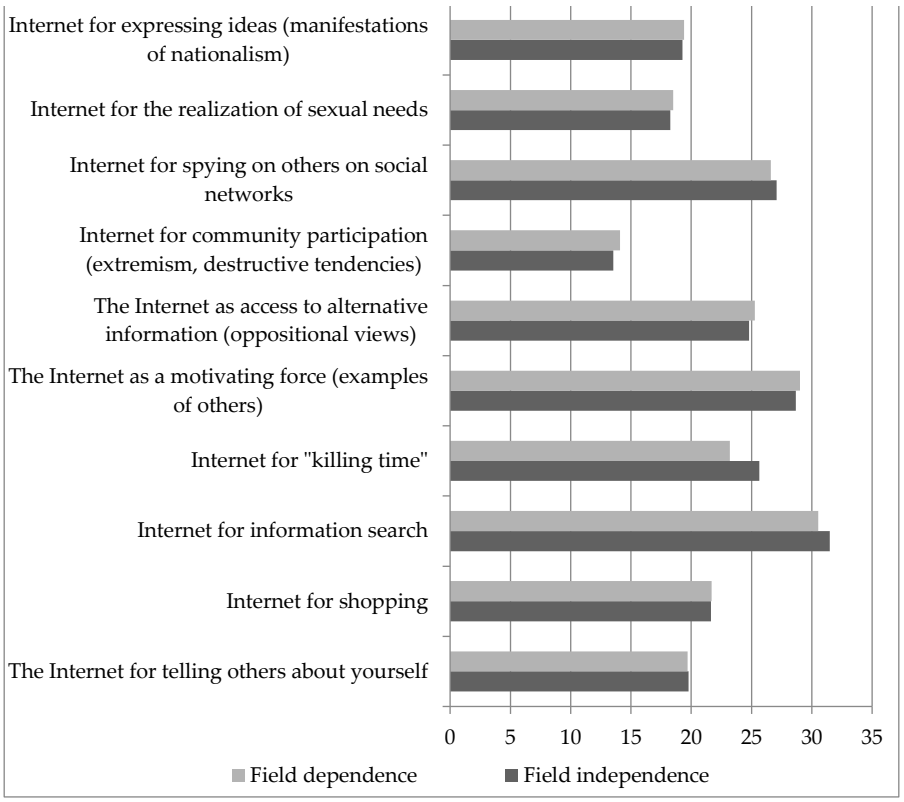

Fig. 6. Choices of the unfinished sentence "Interesting to me sites..."

The results demonstrate that in both groups, the most relevant meanings related to the Internet are awareness and vitality (Figure 6). However, the main meaning associated with the Internet for the field–independent is information (U=603; p=0.003), for the field–dependent - Internet life (U=841.7; p=0.001).

Of course, due to their structuring, the field-independent respondents rather concretized their answer, which cannot be said about the field-dependent ones, whose response is very generalized, more emotional. Apparently, this also affected the next position in the survey. The sites visited by respondents are diverse (Figure 6).

The group of field-independent people selects sites related to information (U=773; p=0.002), cognition and entertainment sites. Respondents who are field-dependent choose entertainment sites and social networks. This result again confirms some social orientation of the field-dependent respondents and some business orientation of the field-independent ones. Next, we correlated our results with the characteristics of the respondents' information behavior. It was found out that two types of informational behavior prevail in the groups of field-independent and field -dependent respondents: search and motivating. At the same time, in the group of field-independent respondents, search behavior (U=567.2; p=0.005) and peeping behavior prevails (U=783; p=0.003). In the group of field-dependent respondents motivating in contacts behavior prevails (U=894.3; p=0.002). These results are combined with the data obtained in the previous measurement. The greatest differences prevail in groups according to the type of behavior of "killing time" (U=704; p=0.00). It is definitely clear that the field-dependent apparently use the Internet more often in situations of aimlessness, loneliness, loss of interest.

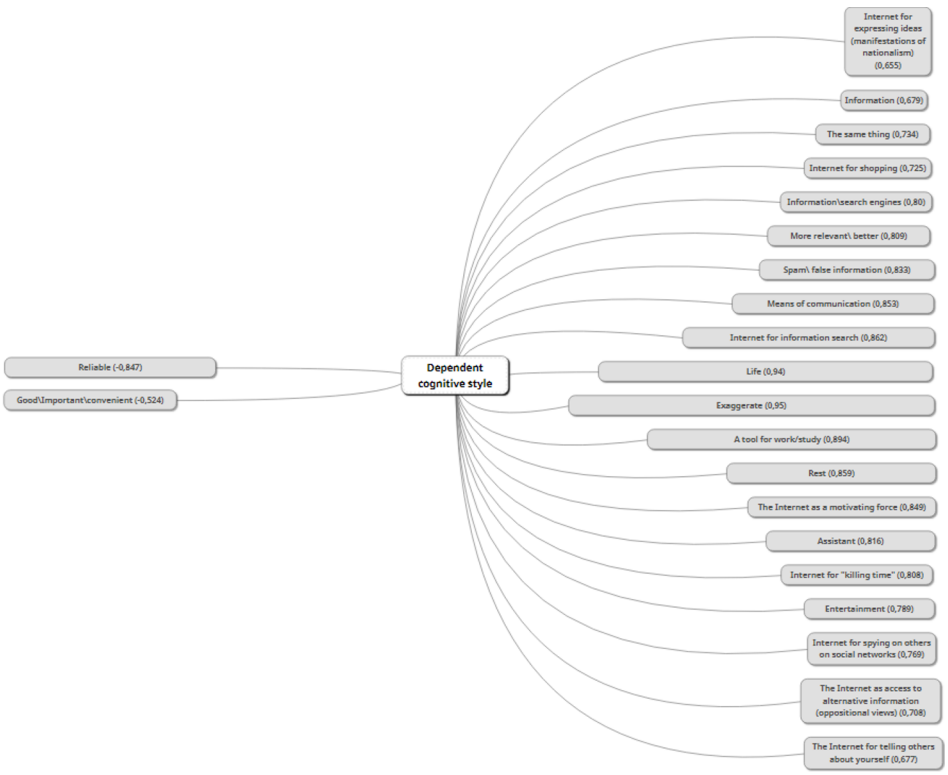

Fig. 7. Field-dependent style Model

The results obtained make it possible to formalize the behavior models of respondents with a useful and non-dependent cognitive style.

Figure 7 demonstrates that the predominant characteristics of a field-dependent cognitive style are the following bundles-constructs in perception and attitude to the Internet. Central (correlation values of 0,8 and more)- Exaggerate (0,95), Life (0,94), A tool for work/study (0,894), Internet for information search (0,862), Rest (0,859), Means of communication (0,853, The Internet as a motivating force (0,849), Spam\ false information (0,833), Assistant (0,816), More relevant\ better (0,809), Internet for "killing time" (0,808), Information\search engines (0,80).

Lateral, less pronounced trends (correlation values less than 0,8) - Entertainment (0,789) Internet for spying on others in social networks (0,769) The same (0.734) Internet for shopping (0,725) Internet as access to alternative information (oppositional views) (0,708) Information (0,679) Internet for telling others about yourself (0,677) Internet for expressing ideas (manifestations of nationalism) (0,655).

Inverse correlations - Reliable (-0,847), Good \ Important\ convenient (-0,524).

Figure 8 shows that the predominant characteristics of the field-independent cognitive style are the following bundles-constructs in perception and attitude to Internet information

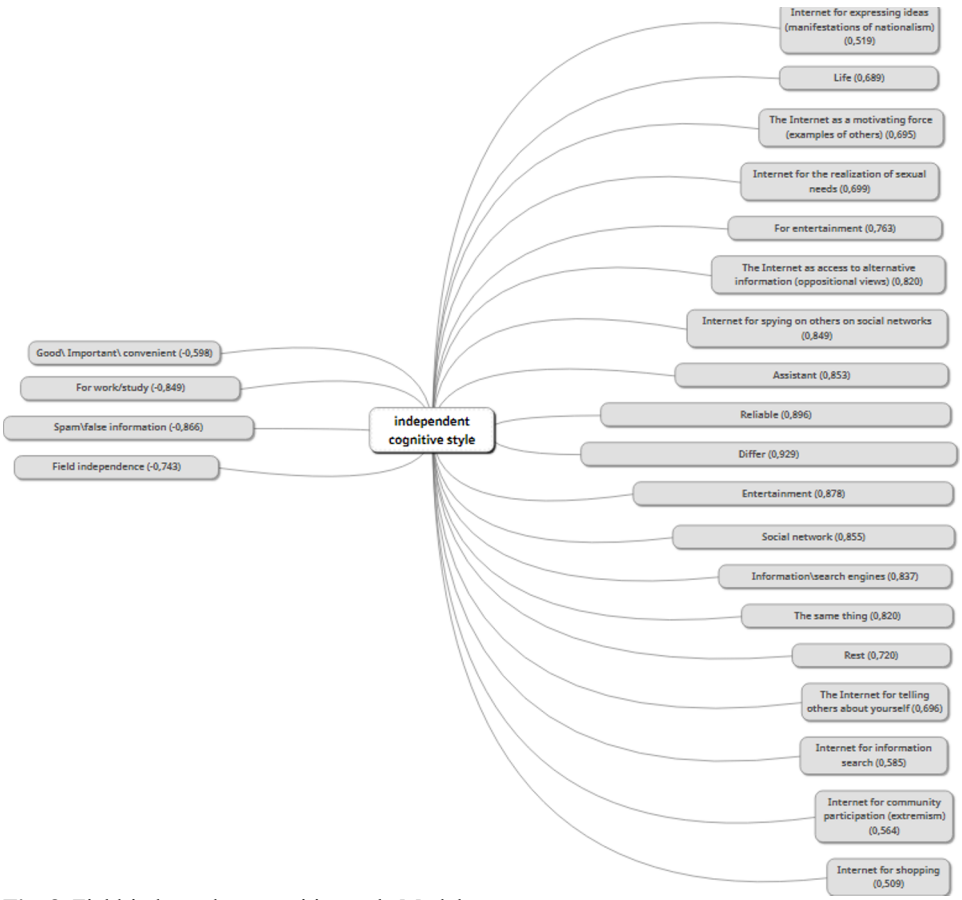

Fig. 8. Field-independent cognitive style Model

Central (correlation values of 0,8 and more) – Differ (0,929), Reliable (0,896), Entertainment (0,878), Social network (0,855), Assistant (0,853), Internet for spying on others on social networks (0,849), Information\search engines (0,837), The Internet as access to alternative information (oppositional views) (0,820), The same thing (0,820).

Lateral, less pronounced trends (correlation values less than 0.8).

Lateral (correlation values 0,6-0,79) – For entertainment (0,763), Rest (0,720), Internet for the realization of sexual needs (0,699), The Internet for telling others about yourself (0,696), The Internet as a motivating force (examples of others) (0,695), Life (0,689),

Minor trends (correlation values 0,5-0,59) - Internet for information search (0,585), Internet for community participation (extremism) (0,564), Internet for expressing ideas (manifestations of nationalism) (0,519), Internet for shopping (0,509).

Inverse correlations – Spam\false information (-0,866), For work/study (-0,849), Field independence (-0,743), Good\ Important\ convenient (-0,598).

4 Discussion

In the educational process, teachers can rely on the strengths of students with different cognitive styles. In the study of I. A. Stepanova [17], the Gottschaldt method was used. It was found out that rationality predicates predominate in the discourse of field-independent respondents. The field-dependent respondents in their discourse use the predicates of visuality, kinesthetic. These results are combined with ours, when the field-independent respondents are more focused on getting information from the Internet for study, and the field-dependent respondents are focused on pleasure. In the work [18] the self-navigation efficiency of electronic maps was determined in connection with the users' thinking style. The results showed that people independent on the field had a higher ability to mental rotation than people dependent on the field. This is connected to our result, which showed that field-independent respondents, due to their constitutional analyticity, cannot tolerate inaccuracy of information.

For the field-independent cognitive style, "establishing connections" is most preferable in Internet communication, as well as for the group of field-dependent people. This result partly overlaps with the study of Meguro, who wrote about the motivational nature of differences in behavior between the field-dependent and the field-independent [13]. Field-independent people value independence and are focused on the independent solution of all their problems, the field-dependent, on the contrary, are more focused on interpersonal contacts and develop communicative abilities in order to attract others to solve their problems [6].

It's worth mentioning that the characteristics of cognitive style are directly related to communication and activity styles. In this regard, we can assume that field-independent respondents are directed in the Internet to search for information and its appropriation in the experience of others. And the field-dependent respondents are most likely in search of alternative information on the Internet and imitate others, motivated by their example. That is, maybe the field-dependent respondents are more likely to be strongly influenced by information. The field-independent, due to their great analytical abilities, are less susceptible to information influence.

We revealed that the main meaning associated with the Internet for the field–independent is information, for the field–dependent - Internet life. This result is combined with the study [19], which reveals significant relationships between strategies for the meanings transmission and components of the meaning-life orientations of social networks users.

Cognitive styles can be applied in the process of teaching students by analogy, as suggested by the authors of the study [9]. By developing a prototype to assess the learning style and cognitive characteristics of each student, it is possible to manage the learning process more effectively. As it is shown in [20], learning improves when learning matches the strengths of students' cognitive styles.

In the context of the study of the peculiarities of media consumption N.V. Sivrikova and F.A. Ivanov found that students are not inclined to trust media information. Youth are characterized by the popularity of various social networks, critical perception of information, risk reduction through an assessment of the degree of trust in various sources of information; the use of verification of suspicious information. There are no characteristics of the specifics

of the informational behavior of students with field-dependent/field-independent cognitive style. At the same time, it is noted that the level of dissemination of extremist ideas is influenced by the criticality of the information received and the level of trust in various sources of information [21, 22, 23, 24, 25].

5 Conclusions

Based on the analysis of the results obtained in the study, it can be concluded that by establishing the cognitive style of thinking of an Internet user, it is possible to predict his behavioral patterns with a certain degree of accuracy and use them in the educational process. To do this, the teacher can pre-conduct a methodology for determining the cognitive style of students at the first lessons. It can also be concluded that teachers should give students with a field-independent cognitive style more freedom, give them more complex tasks. Students with a field-dependent cognitive style are more dependent on teaching instructions. It is better for them to work in groups, rely on collective decisions. Using Internet technologies in the educational process, the teacher should give students with a field-independent cognitive style tasks to search for information of a more analytical nature. Students with a field-dependent cognitive style can be involved in the learning process with the help of game situations based on various communication techniques.

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