

FLOW EXPERIENCE AMONG FUTURE TEACHERS DURING STUDIES

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ABSTRACT

According to Csikszentmihalyi (1990, pg. 4), flow is “an optimal, extremely enjoyable state in which people are so involved in an activity that nothing else seems to matter...”. In this study flow has been measured with the Flow Questionnaire (Csikszentmihalyi & Csikszentmihalyi, 1988). The research was conducted on the sample of 200 students. The aim of this research was to determine whether there was a difference in the flow experience during studies among the students of the Faculty of Teacher Education (FTE) (Informatics, Primary education) and the students of the Faculty of Science (FS), Department of Mathematics (Teachers). It was also investigated which variables (knowledge and skills in computing science/informatics, subjective well-being) contribute to the more intense and more frequent flow experience during studies. Conclusions: There were no statistically significant differences in flow between students studying at the FTE and FS found, and the average flow during studies for both groups was $M=4.93$, measured on the scale ranging from 1 to 8. The proportion of the variance of flow explained by the inspected variables was 37.6% and it was statistically significant ($F=20.68$; $df=6$; $p<0.001$), but the only significant predictors were positive affect ($\beta=0.45$; $p<0.001$) and negative affect ($\beta=-0.25$; $p<0.001$). Students’ grades were used as means of measuring knowledge and skill; however, it was found that they were not connected with the intensity or frequency of the occurrence of flow.

Key words: *optimal experience, informatics, computing science, subjective well-being*

INTRODUCTION

Although the concept of flow may be new to the scientific community; the experience itself is not. In the study of how an individual perceives a certain activity, we inevitably arrive at the concept of the autotelic experience, i.e. things that individuals do for the very sake of the activity being performed. A question hereby raised is why people perform time-consuming, difficult and often dangerous activities for which they receive no extrinsic rewards. In the state of flow, individuals enjoy the activity so much that they are willing to go to great lengths to experience it again, describing it as a current which carries them along effortlessly. Flow can therefore be defined as a subjective state in which people are involved in the activity to the point of forgetting time, fatigue and everything but the activity itself (Csikszentmihalyi, Abuhamdeh & Nakamura, 2005).

Csikszentmihalyi, Abuhamdeh & Nakamura (2005) propose that, although the state of flow is relatively rare in everyday life, almost everything can produce it, given that certain conditions are met. According to the authors' past research, three preconditions are necessary to trigger the state of flow. First, flow tends to occur when the activity contains a clear set of goals, which serve to add direction and purpose to the activity, structuring experience by directing attention to the given task. Second, a certain balance between the perceived challenges and one's skills is needed. However, the emphasis here is on the perception of the demands and abilities, rather than their objective presence. A challenge must not exceed the level of one's skills, because this may lead to anxiety; on the other hand, if skills exceed the challenge, this may easily lead to boredom. Third, flow depends on the presence of clear and immediate feedback, which informs an individual of how well he or she is progressing and determines whether the present course of action needs to be adjusted or continued (Csikszentmihalyi, Abuhamdeh & Nakamura, 2005).

Given that a student's life revolves around his or her studies and that a greater percentage of the workday is occupied by the process of performing academic tasks at university or at home, they are considered to be good candidates for the flow experience. Furthermore, with regard to different academic areas which may be the sources of flow, the role of computers and new technology in general cannot be ignored. The role computers and technology play in Italian students' lives was analyzed by

Bassi and Delle Fave (2004). Their participants reported a higher frequency of flow experience when using computers to search for information or prepare home assignments as compared to paper-and-pencil work or skimming through books.

Studies imply that the link between the learning activities and the flow experience may have both long- and short-term results (Shernoff & Csikszentmihalyi, 2009). As regards the short-term results, students experience enjoyment and a sense of achievement while performing learning tasks (Delle Fave & Bassi, 2000). They report high levels of positive affect and low levels of negative affect (Rogatko, 2009), along with the high levels of engagement in the task given, which finally result in high academic achievement. The benefits of flow can also be noted in students' lives outside the education. For instance, it has been found among British students that individuals reporting intense flow experiences at least twice during the tested week achieved higher scores of mental health than those reporting flow of lower intensity (Clarke and Haworth, 1994). As regards the long-term consequences, research has shown that flow plays an important role in sustaining commitment to learning and academic striving, and in shaping individuals' psychological selection (Asakawa & Csikszentmihalyi, 1998; Delle Fave & Massimini, 2005). Moreover, flow has been identified as a predictor of continued motivation in certain subjects (Shernoff & Hoogstra, 2001). This may eventually affect students' choices of their future careers and work interests in general (Csikszentmihalyi & Schneider, 2000; Wong & Csikszentmihalyi, 1991).

Another important question that may be raised is during which activities do students experience flow once they have graduated and began their teaching careers? In a research which Delle Fave and Massimini (2003) conducted among teachers and physicians, all teachers reported flow experiences. Most frequently stated activities were reading, followed by hobbies (painting, drawing, creative writing, playing music), teaching, sports, listening to music and studying. The authors also investigated the activities which participants associated with the most intense flow experiences, whereas each participant was able to choose only one activity from the previously listed ones, which were grouped into three categories by the authors: work, leisure and the use of media. Teaching and individual work (preparing lessons, grading tests, etc.) were the two types of activities selected in the first group, each of which accounted for 50% of the answers. Sports and hobbies were selected in the second group, accounting for 76% of the answers, whereas media use mostly referred to reading books and accounted for 83% of the answers. As regards their motivation in choosing teaching as their career, 59% of the teachers stated interest and vocation,

i.e. intrinsic motivation. This category was comprised of two major subcategories of answers: passion and vocation for the activity in general (36%) and interest in working with children and transmitting information and culture (23%). This result was followed by participants reporting that they had chosen their professions because of financial need, family pressures or by chance. Teachers reported positive feedback from teaching, and with regard to the source of such feedback, they mainly referred to the students' attention and involvement, the gratification deriving from the interaction and personal relationship with students. As regards negative feedback, teachers primarily indicated negative or no feedback from their students, followed by problems in relationships with colleagues and supervisors. They also reported burdens and boring bureaucracy tasks and finally frustration due to the lack of educational results despite teachers' efforts (Delle Fave & Massimini, 2003).

Past studies have suggested that investigating flow among college students may prove fruitful, because they choose the area of their studies on their own and their field of study is something that evokes their interest. Comparing students studying at different faculties and their experience of flow during engagement in academic tasks should therefore yield similar results. Students' skills and knowledge concerning the particular task they perform plays an important role, because this implies that their skills and abilities are well suited to the given challenge, which is one of the eight dimensions of the flow experience perception listed by Csikszentmihalyi: (1) clear goals and immediate feedback; (2) personal skills well suited to the given challenges; (3) merging of action and awareness; (4) concentration on the task at hand; (5) a sense of potential control; (6) a loss of self-consciousness; (7) an altered perception of time; (8) autotelic experience (Csikszentmihalyi, 1975). A positive correlation between flow and life satisfaction has been proposed by Asakawa (2010), whereas a study conducted by Delle Fave, Bassi & Massimini (2009), which compared life satisfaction scores of participants reporting flow and those who did not report flow, shows that there is no significant difference between these two groups of participants. Furthermore, Rogatko (2009) showed that participants reporting high levels of flow had higher scores in positive affect and lower in negative affect than the participants of the other group, who reported lower levels of flow experiences. It has also been suggested that the increase in the positive affect and the decrease in the negative affect may be direct consequences of performing optimal experiences.

HYPOTHESES

The aim of this research was to determine whether there were any differences in the flow experience during studies among students studying at the Faculty of Teacher Education (FTE) and the Faculty of Science (FS), and to what extent do knowledge and skills in computing science/informatics, as well as subjective well-being, contribute to the flow experience.

Problems:

- a) To determine whether there are any differences in the flow experience during studies between students of the FTE and FS, who are all future teachers.

Hypothesis: there are no statistically significant differences in the flow experience between the two groups of students during their studies.

- b) To determine which variables contribute to the more intense and more frequent flow experience during studies.

Hypothesis: Those students who possess more knowledge and better skills in computing science/informatics, as well as greater subjective well-being, experience flow more intensely and more frequently during their studies.

- c) To determine which activities related to computing science/informatics contribute to the flow experience most.

Hypothesis: Programming contributes to the flow experience most.

METHOD

Participants

The study was conducted on a sample of 200 students of the University of Zagreb. The sample consisted of 118 students (98 female and 20 male) studying at the Faculty of Teacher Education (FTE) and 82 students (60 female and 22 male) studying at the Faculty of Science (FS), Department of Mathematics.

Instruments

Several questionnaires have been used in the research: the Flow Experience Questionnaire (Csikszentmihalyi & Csikszentmihalyi, 1988), the Satisfaction with Life Scale (Diener, Emmons, Larsen & Griffin, 1985), and the Positive and Negative Affect Schedule (Watson, Clark & Tellegen, 1988). The Flow Experience Questionnaire was developed by Csikszentmihalyi and Csikszentmihalyi (1988). It consists of two parts: the first part consists of quotations provided by people who had had flow experiences and the second part of twelve statements which participants had to rate on an 8-point Likert type scale.

Subjective well-being was measured by the Satisfaction with Life Scale (SWLS) and the Positive and Negative Affect Schedule (PANAS). The SWLS is a global measure of life satisfaction developed by Diener et al. (1985). It consists of 5 items that are filled in by the individual whose life satisfaction is being measured. PANAS was created by Watson et al. (1988). It consists of 2x10-item mood scales measuring positive and negative affect where participants are asked to assess their life in general.

The level of skill and knowledge about computer programming was measured by the very first grade the student received at university in general and the first grade in computer programming. The students' interest in computer programming was also rated on a 5-point Likert type scale.

Students were asked to assess, on a 5-point Likert-type scale, in which activities (reading university-related literature, writing seminars, engaging in activities outside university) related to computer science-informatics they experience flow.

Procedure

The data were collected by paper-pencil testing in March and April of 2011. The participants were informed that the research was about the flow experience in studying and being engaged in activities related to computer programming. The questionnaire was anonymous.

RESULTS

First, differences in the flow experience during studies between the students of FTE and FS were tested. As it can be seen from *Table 1*, there were no differences in the flow experience between the two groups of

students. The average flow during studies was $M=4.93$ ($SD=0.84$), measured on a 8-point Likert type scale.

Table 1. Descriptive parameters for the flow variable calculated on the whole sample and the results of t-test between the students of FTE and FS

	N	M	SD	Min	Max	t-test	df	Sign.
Flow total	197	4.9302	0.83911	2.25	6.67	-0.27	195	0.79

Second, a regression analysis was conducted to determine which variables contribute to the higher flow experience during studies. The variables included in the analysis were: the grades the student had at university, the interest in computer programming, positive and negative affect and life satisfaction. The proportion of variance explained was 37.6% and it was statistically significant ($F=20.68$; $df=6$; $p<0.001$). The data presented in *Table 3* show that the only significant predictors of flow during studies were the positive affect ($\beta=0.45$; $p<0.001$) and the negative affect ($\beta=-0.25$; $p<0.001$).

Table 2. Results of the regression analysis for the flow experience

R	R ²	Adjusted R ²	Std. Error of the Estimate	F	Significance
.629	.395	.376	.663	20.68	.000

Table 3. Standardized coefficients of the regression analysis

	Standardized Beta Coefficients	t-test	Significance
First grade in computer programming	-.107	-1.597	.112
Average grade in general	.026	.434	.665
Interest in computer programming	.072	1.050	.295
Positive affect	.450	6.796	.000
Negative affect	-.247	-4.068	.000
Life satisfaction	.062	.973	.332

Finally, since both groups of students study computer science and informatics to a greater or lesser degree, we tried to see which activities connected to computer science and informatics they were most engaged in. As it can be seen in *Table 4*, the group of students studying at the Faculty of Teacher Education experience flow most frequently during *Seminar work related to computer science/informatics* ($M=3.26$; $SD=1.13$) and least frequently while *Programming* ($M=2.00$; $SD=1.54$) (measured on a 5-point

Likert-type scale). Students of the Faculty of Science – Mathematics experience flow most while engaged in the *Activities related to computer science/informatics, but outside of their studies* ($M=2.33$; $SD=1.29$) and least while *reading technical and scientific literature related to computer science/informatics* ($M=1.88$; $SD=1.08$) (measured on a 5-point Likert-type scale).

Table 4. Mean values in flow-inducing activities of students of FTE and FS

	Faculty of Teacher Education		Faculty of Science - Mathematics	
	Mean	Std. Deviation	Mean	Std. Deviation
Reading technical and scientific literature related to science/informatics.	2.40	1.07	1.88	1.08
Seminar work related to computer science/informatics.	3.26	1.13	1.91	1.12
Programming	2.00	1.54	2.30	1.27
Solving problems or tasks related to computer science/informatics.	3.08	1.14	2.30	1.15
Activities related to computer science/informatics, but outside of studies.	3.03	1.32	2.33	1.29

DISCUSSION

The first hypothesis, assuming that there were no differences between faculties in the average students' flow experience, was confirmed. Students choose their study field according to their personal preferences and activities they are good at. While engaged in these activities they are intrinsically interested in, they experience flow often, which is defined as the experience during which awareness and task merge. This experience is self-rewarding (autotelic) so people try to repeat it by engaging in the activities that induce it (Nakamura & Csikszentmihalyi, 2002), e.g. if they are good at math, they will probably choose to study it.

The average flow that students had experienced during their studies was $M=4.93$ measured on an 8-point Likert-type scale. So, it can be concluded that during their studies students experience flow, but not on a very high level. This result is in line with the research conducted in public schools in the United States which has shown that flow is a rare

phenomenon in public schooling (Shernoff & Csikszentmihalyi, 2009). This is so because schooling is mostly a passive, individualistic, and teacher-controlled activity (Goodlad, 1984; according to Shernoff & Csikszentmihalyi, 2009); therefore, it is not likely to induce flow. Flow during studies is important, and several studies demonstrate that flow is associated with higher commitment and achievement during high school years (Carli, Delle Fave, & Massimini, 1988; Nakamura, 1988). Studies have also shown that the time spent in the state of flow can be a predictor of self-esteem (Adlai-Gail, 1994; according to Nakamura & Csikszentmihalyi, 2002) and can have positive influence on one's physical health (Patton, 1999; according to Nakamura & Csikszentmihalyi, 2002).

Regression analysis was conducted to determine which variables contribute to a more intense flow experience during studies. The proportion of variance explained was 37.6% and it was statistically significant ($F=20.68$; $df=6$; $p<0.001$). The only two significant predictors were positive affect ($\beta=0.45$; $p<0.001$) and negative affect ($\beta=-0.25$; $p<0.001$). It was assumed that greater subjective well-being and knowledge are connected with more intense flow experiences. Although some studies show positive correlation between life satisfaction and flow (e.g. Asakawa, 2010), these results are in line with the study carried out by Delle Fave, Bassi, & Massimini (2009; according to Delle Fave, Massimini & Bassi, 2011), who detected no significant difference in life satisfaction between teenagers reporting optimal experiences and teenagers not reporting flow. The latter study researched the flow experience in the lives of Italian adolescents and showed that teenagers reporting flow scored higher in positive affect and lower in negative affect than their counterparts. Affect is not a predominant feature of the optimal experience, but the increase in positive affect and the decrease in negative affect can stem from the optimal experience. Reflecting on the involvement in a recently carried out task and on the perception of successful investment of high personal abilities in the opportunities for growth and self-expression can enhance positive affect and reduce negative feeling states (Delle Fave, Massimini & Bassi, 2011). Although flow should, by increasing positive emotions and decreasing the negative ones, also increase life satisfaction, this is clearly not the case. Studying should also be perceived as a meaningful activity and engaging in it should contribute to a fulfilled life (Seligman, 2002), but results do not confirm this hypothesis.

Moreover, it was assumed that greater knowledge would contribute to greater flow, and it was measured using the *grades in computer programming* and the *average grade in general*. According to Csikszentmihalyi (1990) optimal experiences rarely occur without reason.

They are usually reported within sequences of activities that are goal-oriented and bounded by rules—activities that require the investment of mental energy, and that could not be performed without the required skills. However, grades, which should indicate skills, were not connected with flow in this study.

The last hypothesis investigated the activities connected with computer science/ informatics during which students experience flow most. Every field of study has its particular demands, so there are some differences between faculties in the activities which induce flow in students. For example, students of the Faculty of Teacher Education experience flow most intensely during *Seminar work related to computer science/informatics* ($M=3,26$; $SD=1,13$) and least intensely while *Programming* ($M=2,00$; $SD=1,54$). This is probably so because they do not have the required computer programming skills to enjoy it. On the other hand, they enjoy writing seminar papers as this is an activity which can also induce flow (a challenging activity that demands skills, clear goals and feedback, etc.) but is not so demanding (they do not need to know the programming language that well). Students of the Faculty of Science – Mathematics experience flow most intensely when engaged in the *Activities related to computer science/informatics, but outside of their studies* ($M=2.33$; $SD=1.29$) and least intensely while *Reading technical and scientific literature related to computer science/informatics* ($M=1.88$; $SD=1.08$). It is understandable that engaging in the *Activities related to computer science/informatics, but outside of studies* induces flow most because it is a broad category which can include all sorts of activities ranging from programming to gaming and surfing social networks. Reading technical and scientific literature is a highly demanding activity which does not offer clear goals and immediate feedback so it is understandable that students enjoy it less.

CONCLUSION

No statistically significant differences have been found between the two groups of students studied, i.e. the participants studying at the FTE and the FS. The average flow during studies for both groups was $M=4.93$. The second hypothesis, predicting that those students who possess more knowledge and are more skilled in computing science/informatics as well as greater subjective well-being experience flow more often during studies has been partially confirmed. The proportion of variance explained for the flow variable was 37.6% and it was statistically significant ($F=20.68$; $df=6$; $p<0.001$), but the only significant predictors were positive affect ($\beta=0.45$;

$p < 0.001$) and negative affect ($\beta = -0.25$; $p < 0.001$). The grades the students received have been used as means of measuring knowledge and skill. However, it has been found that they are not connected with the intensity or frequency of the occurrence of flow. The third hypothesis stated that programming was one of the activities during which students experience flow most often. It has been found that the students of the FTE experience flow most intensely during *Seminar work related to computer science/informatics* ($M = 3.26$; $SD = 1.13$), and least while *programming* ($M = 2.00$; $SD = 1.54$). On the other hand, the students of the FS experience flow most intensely when *engaged in activities related to computer science/informatics, but also outside studies* ($M = 2.33$; $SD = 1.29$) and least while *reading technical and scientific literature related to computer science/informatics* ($M = 1.88$; $SD = 1.08$).

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ISKUSTVO ZANESENOSTI KOD BUDUĆIH NASTAVNIKA TIJEKOM STUDIJA

SAŽETAK

Prema Csikszentmihalyu (1990, str. 4), zanesenost je "optimalno, vrlo ugodno stanje u kojem su ljudi toliko zaokupljeni aktivnošću da im ništa drugo nije važno..." U ovoj studiji zanesenost (eng. flow) mjerena je s Upitnikom zanesenosti (Csikszentmihalyi i Csikszentmihalyi, 1988). Istraživanje je provedeno na uzorku od 200 studenata. Cilj ovog istraživanja je bio da se utvrdi postoji li razlika između iskustva zanesenosti tijekom studija kod studenata Učiteljskog fakulteta (modul informatika, primarno obrazovanje) i studenata Prirodoslovno-matematičkog fakulteta (matematički odjel, nastavnički smjer). Istraženo je, također, koje varijable pridonose intenzivnijem i češćem iskustvu zanesenosti tijekom studija (znanje i sposobnosti u području računarstva/informatike, subjektivna dobrobit). Zaključci: ne postoji statistički značajna razlika u iskustvu zanesenosti između studenata UF-a i PMF-a, prosječno iskustvo zanesenosti tijekom studija za obje grupe je bilo $M=4.93$, na skali od 1 do 8. Postotak objašnjene varijance zanesenosti promatranim varijablama iznosi 37.6% i statistički je značajan ($F=20.68$; $df=6$; $p<0.001$), no jedini značajni prediktori bile su pozitivne emocije ($\beta=0.45$; $p<0.001$) i negativne emocije ($\beta=-0.25$; $p<0.001$). Ocjene koje su studenti dobivali su upotrijebljene kao sredstvo za mjerenje znanja i vještine, međutim zaključeno je da ne stoje u izravnoj vezi s intenzitetom i frekvencijom iskustva zanesenosti.

Ključne riječi: zanesenost, optimalno iskustvo, informatika, računarstvo, subjektivna dobrobit

UVOD

Pojam zanesenosti (eng. flow) je možda nov u svijetu znanosti, ali iskustvo o njemu nije. Proučavanjem kako osoba percipira određenu aktivnost dolazimo do pojma autoteličnog iskustva, tj. stvari koji osobe čine samo zbog užitka u određenoj aktivnosti. Postavlja se pitanje zašto ljudi

sudjeluju u aktivnostima koje oduzimaju puno vremena, komplicirane su i često opasne, iako ne dobivaju nikakvu ekstrinzičnu nagradu. Zanesenost se, stoga, može definirati kao subjektivno stanje u kojem su ljudi toliko zaokupljeni aktivnošću da zaboravljaju na vrijeme, umor i sve ostalo osim same aktivnosti (Csikszentmihalyi, Abuhamedh i Nakamura, 2005).

Csikszentmihalyi, Abuhamedh i Nakamura (2005) tvrde da gotovo sve može dovesti do stanja zanesenosti, ukoliko su određeni uvjeti ispunjeni. Prema njihovom prethodnom istraživanju tri preduvjeta su nužna kako bi se dostiglo stanje zanesenosti. Prvo, zanesenost se javlja ukoliko aktivnost sadrži jasne ciljeve koji usmjeravaju i daju svrhu aktivnosti, strukturirajući iskustvo usmjeravanjem pažnje na zadatak. Drugo, potrebna je određena ravnoteža između percipiranih izazova i vještine. Naglasak je ovdje na percepciji zahtjeva i sposobnosti, a ne na njihovoj objektivnoj prisutnosti. Izazov ne smije prijeći razinu sposobnosti osobe, jer to može dovesti do anksioznosti; s druge strane, ako vještine prelaze razinu izazova, dolazi do dosade. Treće, zanesenost ovisi o prisutnosti jasne i neposredne povratne informacije (feedbacka), koja informira osobu kako dobro on ili ona napreduje i određuje treba li podesiti ili nastaviti trenutačnu aktivnost (Csikszentmihalyi, Abuhamedh i Nakamura, 2005).

Studente možemo smatrati dobrim kandidatima za stanje zanesenosti, jer im se život vrti oko učenja i veliki postotak radnog dana zauzima obavljanje akademskih zadataka. Nadalje, uloga računala i novih tehnologija ne može se više ignorirati u različitim akademskim područjima. Bassi i Delle Fave (2004) su analizirali ulogu računala i tehnologije u životima talijanskih studenata. Rezultati su pokazati da su ispitanici iskusili stanje zanesenosti češće i intenzivnije kada su upotrebljavali kompjutor kao način pronalazjenja informacija ili za pripremanje domaćih zadaća, u usporedbi s pisanjem ili traženjem po knjigama.

Istraživanja ukazuju da veza između aktivnosti učenja i iskustva zanesenosti može imati dugotrajne ili kratkotrajne posljedice (Shernoff i Csikszentmihalyi, 2009). Što se tiče kratkotrajnih posljedica, učenici doživljavaju zadovoljstvo i osjećaj postignuća za vrijeme aktivnosti učenja (Delle Fave i Bassi, 2000), pri čemu se javljaju visoke razine pozitivnih emocija i niske razine negativnih emocija (Rogatko, 2009), zajedno s visokom razinom angažiranosti zadatkom, što konačno rezultira visokim akademskim postignućem. Dobrobiti stanja zanesenosti se mogu primijetiti i u životu studenata. Na primjer, kod britanskih studenata primijećeno je da studenti koji doživljavaju intenzivnu zanesenost najmanje dvaput tjedno postižu više rezultate mentalnog zdravlja od onih koji su doživljavali zanesenost manje intenzivno (Clarke i Haworth, 1994). Što se tiče dugotrajnih posljedica, istraživanja su pokazala da zanesenost igra važnu ulogu u zadržavanju

posvećenosti učenju i akademskom postignuću (Asakawa i Csikszentmihalyi, 1998; Delle Fave i Massimini, 2005). Štoviše, zanesenost je identificirana kao prediktor kontinuirane motivacije u određenim predmetima (Shernoff i Hoogstra, 2001), što se u konačnici može odraziti na odabir karijere i radnih interesa općenito (Csikszentmihalyi i Schneider, 2000; Wong i Csikszentmihalyi, 1991).

Provedena istraživanja i činjenica da studenti sami biraju područje svojeg studija, što znači da je to nešto što ih interesira, upućuju na to da bi istraživanje zanesenosti kod studenata moglo biti plodonosno. Pretpostavka je stoga da će usporedba studenta koji studiraju na različitim fakultetima dovesti do sličnih rezultata. Vještine i znanja studenata igraju važnu ulogu u izvođenju određenog zadatka, jer to implicira da njihove vještine i sposobnosti odgovaraju danom izazovu. Prema Csikszentmihalyiju ovo su osam dimenzija zanesenosti: (1) jasan cilj i neposredna povratna informacija (feedback); (2) vještine koje odgovaraju danom izazovu; (3) stapanje akcije i svjesnosti; (4) koncentracija na zadatak; (5) osjećaj kontrole; (6) gubitak samo-svjesnosti; (7) promijenjena percepcija vremena; (8) autotelično iskustvo (Csikszentmihalyi, 1975). Asakawa (2010) je utvrdio da postoji pozitivna korelacija između zanesenosti i zadovoljstva u životu, dok su Delle Fave, Bassi i Massimini (2009) pokazali da postoji razlika u zadovoljstvu životom između ispitanika koji doživljavaju i onih koji ne doživljavaju stanje zanesenosti. Nadalje Rogatko (2009) je pokazala da ispitanici koji doživljavaju viši stupanj zanesenosti doživljavaju više pozitivnih i manje negativnih emocija, od ispitanika koji doživljavaju zanesenost na nižem stupnju.

HIPOTEZE

Cilj ovog istraživanja je utvrditi postoje li razlike u stanju zanesenosti tijekom studija kod studenata Učiteljskog Fakulteta (UF) i studenata Prirodoslovno-Matematičkog Fakulteta (PMF-a), i u kojoj mjeri znanje i vještine u području informatike/računarstva, kao i subjektivna dobrobit, pridonose doživljavanju stanja zanesenosti.

Problemi:

- a) Utvrditi postoje li razlike u iskustvu zanesenosti za vrijeme studija kod studenata UF-a i PMF-a, budućih nastavnika.
- b) Hipoteza: Ne postoje statistički značajne razlike u iskustvu zanesenosti između ove dvije grupe studenata za vrijeme studija.
- c) Utvrditi koje varijable pridonose intenzivnijem i češćem iskustvu zanesenosti za vrijeme studija.

- d) Hipoteza: Studenti koji imaju više znanja i bolje vještine u području informatike/računarstva, kao i veću subjektivnu dobrobit, doživljavaju stanje zanesenosti intenzivnije i češće za vrijeme studija.
- e) Utvrditi koje aktivnosti povezane s informatikom/računarstvom najviše pridonose doživljavanju stanja zanesenosti.
- f) Hipoteza: Programiranje najviše pridonosi doživljavanju stanja zanesenosti.

METODE

Ispitanici

Istraživanje je provedeno na uzorku od 200 studenata Sveučilišta u Zagrebu. Uzorak se sastojao od 118 studenata (98 žena i 20 muškaraca) s UF-a i 82 studenata (60 žena i 22 muškaraca) s PMF-a, Matematički odjel.

Instrumenti

Upotrijebljeno je nekoliko upitnika: Upitnik iskustva zanesenosti, eng. Flow Experience Questionnaire (Csikszentmihalyi i Csikszentmihalyi, 1988), Skala zadovoljstva životom, eng. Satisfaction with Life Scale (Diener, Emmons, Larsen i Griffin, 1985) i Upitnik pozitivnih i negativnih emocija, eng. Positive and Negative Affect Schedule (Watson, Clark i Tellegen, 1988). Upitnik iskustva zanesenosti, autora Csikszentmihalyi i Csikszentmihalyi (1988), sastoji se od dva dijela: prvi dio se sastoji od citata pojedinaca koji su imali iskustva sa zanesenosti, a drugi dio od dvanaest izjava koje su ispitanici morali procijeniti na skali Likertovog tipa od 1 do 8.

Subjektivna dobrobit mjerena je Skalom zadovoljstva sa životom (SWLS) i Skalom pozitivnih i negativnih emocija (PANAS). SWLS je globalna mjera zadovoljstva sa životom, koju su razvili Diener i suradnici (1985). Sastoji se od 5 čestica generalnog zadovoljstva životom. PANAS su razvili Watson i suradnici (1988), a sastoji se od po 2x10 čestica koje mjere pozitivne i negativne emocije, a od ispitanika se traži da ocijene svoj život u cjelini.

Razina znanja i vještine u programiraju se mjerila prvom ocjenom dobivenom na fakultetu i prvom ocjenom u kolegiju iz programiranja. Interes za programiranje se mjerio Likertovom skalom od 1 do 5.

Studente se također tražilo da ocijene na skali Likertovog tipa od 1 do 5 za vrijeme kojih aktivnosti (čitanje literature vezane za fakultet, pisanje seminara, aktivnosti izvan fakulteta) vezanih na računarstvo/informatiku doživljavaju stanje zanesenosti.

Postupak

Podatci su sakupljeni testiranjem u ožujku i travnju 2011. godine. Ispitanici su obaviješteni da se provodi istraživanje o zanesenosti za vrijeme studija i za vrijeme aktivnosti povezanih s programiranjem. Uпитnik je bio anonimn.

REZULTATI

Prvo su testirane razlike u doživljavanju stanja zanesenosti tijekom studija kod studenata UF-a i PMF-a. Kao što je vidljivo u *Tablici 1*, ne postoje razlike u iskustvu zanesenosti između dvije grupe studenata. Prosječna zanesenost tijekom studija iznosi $M=4.93$ ($SD=0.84$), mjerena na skali Likertovog tipa od 1 do 8.

Tablica 1.

Zatim je provedena regresijska analiza kako bi se utvrdilo koje varijable pridonose većem iskustvu zanesenosti tijekom studija. Varijable koje su bile uključene u analizu su: studentove ocjene na fakultetu, interes za programiranje, pozitivne i negativne emocije te zadovoljstvo životom. Postotak varijance zanesenosti objašnjen promatranim varijablama iznosi 37.6% i statistički je značajan ($F=20.68$; $df=6$; $p<0.001$). U *Tablici 3* je prikazano je da su jedini značajni prediktori zanesenosti za vrijeme studija pozitivne ($\beta=0,45$; $p<0,001$) i negativne emocije ($\beta= -0,25$; $p<0,001$).

Tablica 2.

Tablica 3.

Budući da obje skupine studenata studiraju računarstvo i informatiku na višem ili nižem stupnju, pokušali smo utvrditi koje aktivnosti vezane s računarstvom i informatikom najviše pridonose zanesenosti tijekom studija. Kao što je vidljivo iz *Tablice 4*, studenti UF-a doživljavaju

zanesenost najčešće tijekom *pisanja seminara iz računarstva i informatike* ($M=3,26$; $SD=1,13$), a najrjeđe tijekom *programiranja* ($M=2,00$; $SD=1,54$) (mjereno na Likertovoj skali od 1 do 5). Studenti PMF-a doživljavaju zanesenost najčešće tijekom *bavljenja aktivnostima povezanim s računarstvom/informatikom, ali izvan svojeg studija* ($M=2,33$; $SD=1,29$), a najrjeđe tijekom *čitanja stručne i znanstvene literature iz računarstva/informatike* ($M=1,88$; $SD=1,08$) (mjereno na Likertovoj skali od 1 do 5).

Tablica 4.

RASPRAVA

Prva pretpostavka, da ne postoje razlike između fakulteta UF i PMF u prosječnoj razini zanesenosti tijekom studija, je potvrđena. Studenti sami izabiru područje studija ovisno o vlastitim sklonostima i vještinama. Tijekom aktivnosti za koje su intrinzično zainteresirani često doživljavaju stanje zanesenosti u kojem se svjesnost i zadatak spajaju u jedno. S obzirom da je ovo iskustvo samo-nagrađujuće (autotelično), učenici će ga pokušati ponoviti sudjelujući u aktivnostima koje ga izazivaju (Nakamura i Csikszentmihalyi, 2002), tj. upisujući studij u području u kojem očekuju da će doživjeti zanesenost.

Prosječni stupanj stanja zanesenosti koji su studenti doživjeli za vrijeme studija je bio $M=4.93$, mjereno na skali Likertovog tipa od 1 do 8. Dakle možemo zaključiti da studenti doživljavaju stanje zanesenosti za vrijeme studija, no ne na visokom stupnju. Ovaj rezultat se poklapa sa istraživanjem provedenim u javnim školama u SAD-u, u kojem se može vidjeti da je zanesenost rijedak fenomen u javnom školstvu (Shernoff i Csikszentmihalyi, 2009). Razlog za to je činjenica da je školovanje većinom pasivna, individualna i od strane nastavnika kontrolirana aktivnost (Goodlad, 1984; prema Shernoff i Csikszentmihalyi, 2009) i stoga nije vjerojatno da će izazvati zanesenost. Iskustvo zanesenosti tijekom studija je važno i mnogo studija upućuje na to da je zanesenost povezana s visokim stupnjem posvećenosti studiju i postignućem za vrijeme srednjoškolskog obrazovanja (Carli, Delle Fave, i Massimini, 1988; Nakamura, 1988). Istraživanja su također pokazala da vrijeme provedeno u stanju zanesenosti može predvidjeti samopouzdanje (Adlai-Gail, 1994; prema Nakamura i Csikszentmihalyi, 2002) i pozitivno utjecati na fizičko zdravlje (Patton, 1999; prema Nakamura i Csikszentmihalyi, 2002).

Upotrijebljena je regresijska analiza kako bi se utvrdilo koje varijable pridonose intenzivnijem iskustvu stanja zanesenosti za vrijeme studija. Postotak varijance objašnjen promatranim varijablama iznosi 37.6% i statistički je značajan ($F=20.68$; $df=6$; $p<0.001$). Značajni prediktori bili su jedino pozitivne ($\beta=0,45$; $p<0,001$) i negativne emocije ($\beta=-0,25$; $p<0,001$). Pretpostavljeno je da su veća subjektivna dobrobit i veće znanje i vještine u području informatike povezani s intenzivnijem iskustvom zanesenosti. Iako neke studije pokazuju pozitivnu korelaciju između zadovoljstva životom i zanesenosti (npr. Asakawa, 2010), ovi rezultati se poklapaju sa studijom koju su proveli Delle Fave, Bassi i Massimini (2009; prema Delle Fave, Massimini i Bassi, 2011) koja nije zamijetila značajne razlike u zadovoljstvu sa životom kod tinejdžera koji su doživljavali stanje zanesenosti i onih koji nisu. Ova studija je istraživala iskustvo zanesenosti u životima talijanskih adolescenata i pokazala da oni koji doživljavaju stanje zanesenosti imaju više rezultate u pozitivnim emocijama i niže u negativnim nego oni koji ne doživljavaju stanje zanesenosti. Emocije nisu dominantno obilježje optimalnog iskustva, ali povećanje pozitivnih i smanjenje negativnih može biti posljedica optimalnih iskustava. Razmišljanje o uspjehu u zadatku i percepcija ulaganja visokih osobnih sposobnosti za rast i samoizražavanje može povećati pojavljivanje pozitivnih i smanjiti pojavljivanje negativnih emocija (Delle Fave, Massimini i Bassi, 2011). Iako bi stanje zanesenosti trebalo, povećanjem pozitivnih i smanjenjem negativnih emocija, također povećati zadovoljstvo životom, to očito ovdje nije slučaj. Učenje bi također trebalo biti percipirano kao značajna aktivnost, sudjelovanje u kojoj bi trebala pridonijeti ispunjenijem životu (Seligman, 2002), ali rezultati ne potvrđuju ovu hipotezu.

Pretpostavljeno je, također, da bi veće znanje trebalo pridonijeti većem stupnju zanesenosti što je bilo mjereno pomoću *ocjena dobivenih u programiranju* i *prosječne ocjene općenito*. Prema Csikszentmihalyi (1990), optimalna iskustva se ne događaju bez razloga. Ona se uobičajeno događaju unutar niza aktivnosti orijentiranih prema cilju i određenih pravilima – aktivnosti koje zahtijevaju ulaganje mentalne energije, što nije moguće bez odgovarajućih sposobnosti. No ocjene, koje iako indiciraju vještine, nisu bile povezane sa stanjem zanesenosti u ovom istraživanju.

Zadnja hipoteza je ispitivala tijekom kojih aktivnosti povezanih s računarstvom/informatikom studenti najčešće doživljavaju stanje zanesenosti. Svako područje studija ima svoje zahtjeve, tako da postoje razlike između fakulteta u aktivnostima koje izazivaju stanje zanesenosti kod studenata. Na primjer, studenti UF-a doživljavaju stanje zanesenosti najintenzivnije dok *pišu seminare iz računarstva/informatike* ($M=3,26$; $SD=1,13$), a najrjeđe dok *programiraju* ($M=2,00$; $SD=1,54$) – razlog tome je vjerojatno nedostatak vještina dovoljnih za užitek u programiranju. S druge

strane oni uživaju u pisanju seminara jer je to također aktivnost koja može izazvati stanje zanesenosti (izazovna aktivnost koja zahtijeva vještinu, jasan cilj i feedback, itd.) ali nije toliko zahtjevna (ne moraju znati programski jezik toliko dobro). Studenti PMF-a doživljavaju stanje zanesenosti najintenzivnije kada se bave *aktivnostima povezanim s računarstvom ili informatikom, ali izvan studija* ($M=2,33$; $SD=1,29$), a najrjeđe kada *čitaju stručnu i znanstvenu literaturu iz računarstva/informatike* ($M=1,88$; $SD=1,08$). Razumljivo je da bavljenje aktivnostima *povezanim s računarstvom/informatikom izvan studija* najčešće izaziva stanje zanesenosti, jer je to široka kategorija koja može uključivati razne aktivnosti - od programiranja, igranja kompjutorskih igrica do surfanja socijalnim mrežama. Čitanje stručne i znanstvene literature je vrlo zahtjevna aktivnost koja ne nudi jasne ciljeve i neposrednu povratnu informaciju, pa je stoga razumljivo da studenti manje uživaju u njoj.

ZAKLJUČAK

Ne postoje statistički značajne razlike u zanesenosti tijekom studija između dvije grupe studenata, tj. ispitanika koji studiraju na UF-u i PMF-u. Prosječni razina stanja zanesenosti za vrijeme studija za obje grupe iznosila je $M=4.93$. Djelomično je potvrđena druga hipoteza da studenti koji imaju više znanja i vještine u računarstvu/informatici ili veću subjektivnu dobrobit, doživljavaju stanje zanesenosti češće za vrijeme studija. Postotak objašnjene varijance zanesenosti tijekom studija s istraživanim varijablama iznosi 37.6% i statistički je značajan ($F=20.68$; $df=6$; $p<0.001$). Značajni prediktori bili su samo pozitivne ($\beta=0,45$; $p<0,001$) i negativne emocije ($\beta=-0,25$; $p<0,001$). Ocjene tijekom studija korištene su kao indikator znanja i vještina studenata, no pokazalo se da one nisu povezane s intenzitetom ili učestalosti iskustva zanesenosti. Treća pretpostavka je bila da je programiranje jedna od aktivnosti za vrijeme koje studenti najčešće doživljavaju stanje zanesenosti. Rezultati pokazuju da studenti UF-a najčešće doživljavaju stanje zanesenosti dok *pišu seminare iz računarstva/informatike* ($M=3,26$; $SD=1,13$), a najrjeđe dok *programiraju* ($M=2,00$; $SD=1,54$). S druge strane, studenti PMF-a doživljavaju stanje zanesenosti najčešće tijekom *aktivnosti povezanih s računarstvom/ informatikom, no izvan studija* ($M=2,33$; $SD=1,29$), a najrjeđe dok *čitaju stručnu i znanstvenu literaturu iz računarstva/informatike* ($M=1,88$; $SD=1,08$).