

2019

Understanding and promoting students' well-being and performance in university studies

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Recommended Citation

Asikainen, Henna; Kaipainen, Kirsikka; and Katajavuori, Nina, Understanding and promoting students' well-being and performance in university studies, *Journal of University Teaching & Learning Practice*, 16(5), 2019.

Available at: <https://ro.uow.edu.au/jutlp/vol16/iss5/2>

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Abstract

The aim of this study was to examine pharmacy students' experiences of a small ACT-based intervention that was implemented as a 7-week course with weekly online modules. Students' well-being, experiences of stress, organised studying and psychological flexibility were measured with questionnaires at the beginning and end of the course. Students' experiences of how the course affected their studying were analysed from open-ended responses and a reflective journal. The results show that students' well-being and time and effort management increased during the course. Students experienced that the course affected their studying in various ways. This study showed that it is possible to foster students' well-being and study skills with an online intervention course. More research is needed to identify the long-lasting effects of these kind of interventions.

Keywords

psychological flexibility; well-being; higher education; university students; stress management; organised studying

Introduction

In modern society, learning and performance have new meanings. The needs of working life have changed, and there has been a shift from aiming to produce content-based experts to promoting lifelong learning and performance-based expertise ready for the unknown needs of the future. In addition, research has shown that many university students, internationally, are suffering from mental illness (Bayram & Bilgel 2008; Graggs 2012). For example, in the Finnish context, almost one-third of university students have experienced mental problems (Kunttu & Pesonen 2013). These problems should be addressed not only for the sake of students' well-being, but because they can easily lead to dropping out and delays in completing studies, especially when research shows that about half of students experiencing mental-health problems do not seek professional help (Zivin, Eisenberg, Gollust & Golberstein 2009). Mental-health problems are often associated with distorted thoughts or an inability to function because of negative feelings and thoughts (Hayes, Luoma, Bond, Masuda & Lillis 2006). Recent studies have also shown that dealing with these negative feelings is closely related to successful study at university (Asikainen, Hailikari, & Mattson 2018). The aim of this study was to examine the experiences and effects of a course based on Acceptance and Commitment Therapy (ACT) that was integrated into university studies to promote students' well-being and skills in managing stress and time.

Psychological flexibility and its relation to well-being and stress management

Recent research has shown that a new and promising element in fostering well-being is psychological flexibility (Hayes et al. 2006; Bond, Joda & Guenole 2013). Its importance has been shown to be related to well-being, life management and performance in several contexts (Chawla & Ostafin 2007; Kashdan, Barrios, Forsyth & Steger 2006; Räsänen, Lappalainen, Muotka, Tolvanen & Lappalainen, 2016). Psychological flexibility describes people's ability to be fully consciously present, accept their own negative experiences, emotions or thoughts and act according to their own goals (Chawla & Ostafin 2007; Hayes et al. 2006; Hayes & Smith 2005). The origin of the concept comes from ACT, which is a treatment approach that focuses on treating experiential avoidance (Hayes et al. 2006), or reluctance to accept negative emotions, thoughts or experiences despite the negative effects they might have (Hayes, Pistorello & Levin 2012). Psychological flexibility is an opposite concept to experiential avoidance: people with high psychological flexibility act based on their own values and accept their negative thoughts and emotions rather than avoiding them, and they deal with these negative emotions and thoughts by accepting the situation and being mindful (Hayes 2006).

In working life, ACT interventions have been shown to improve performance, well-being and stress management in the workplace (Flaxman, Bond, Livheim & Hayes 2013; Waters, Frude, Flaxman & Boyd 2017) and have been shown to be successful in treating depression (Kuonanoja, Langrial, Lappalainen, Lappalainen, & Oinas 2015; Lappalainen, Granlund, Siltanen, Ahonen, Vitikainen, Tolvanen & Lappalainen 2014). Some studies of interventions have been conducted in the higher-education context, but research so far is scarce. Studies have found that ACT-based interventions significantly decrease university students' symptoms of depression and stress (Räsänen et al. 2016) and decrease distress, anxiety, depression and academic concerns (Levin et al. 2017). Mindfulness based interventions have also been shown to decrease students' stress levels (Galante, Dufour, Vainre, Wagner, Stochl, Benton & Jones 2018; Gray, Font, Unrau & Dawson 2018). However, these efforts are mainly occasional interventions or are included in student counselling. In addition, these studies do not explore the effects of the intervention on either learning or studying. Our recent studies have shown that students' well-being is related to their learning processes (Asikainen et al. 2019; Häsä et al. 2019). Other recent research has shown that psychological flexibility has a

significant effect on study progression and positive emotions in learning at university (Asikainen et al. 2018) and is positively related to interaction with teachers and peers as well as commitment to studies (Asikainen 2018). In addition, recent research has shown that psychological flexibility has a strong relationship with academic outcomes and student well-being (Levin, Haeger, Pierce & Twohig 2017; Levin, Krafft, Pistorello & Seeley 2018). Thus, research is confirming its importance in higher education.

Organised studying

Research has shown that organised studying can be very important for successful university study (Asikainen, Parpala, Lindblom-Ylänne, Vanthournout & Coertjens 2014; Hailikari & Parpala 2014; Rytönen, Parpala, Lindblom-Ylänne, Virtanen & Postareff 2012). Organised studying, which can be defined as time and effort management in studies (Entwistle & McCune 2004), has been shown to be strongly related to study progression (Hailikari & Parpala 2014; Rytönen et al. 2012). Students' time-management skills can be promoted through interventions in which students learn and practise organising skills (Häfner, Obers & Stock 2014). Recent research has also shown that organised studying has a positive relation to well-being (Asikainen et al. 2019). Thus, in our intervention, we also wanted to promote students' time- and effort-management skills relating to their studies.

Aim of the study

The aim of this study was to conduct a pilot study that combines quantitative and qualitative data. The objective was to explore the students' experiences of an intervention designed to promote psychological flexibility, stress management and well-being, as well as their time management skills. We explored the following research questions: How did students' experiences of psychological flexibility, stress, well-being and organised studying change during an intervention? How did the intervention affect students in their learning and studying?

Based on previous studies, we set three hypotheses:

Hypothesis 1: The intervention will positively affect students' well-being and psychological flexibility and reduce their experiences of stress (Räsänen et al. 2016; Levin et al. 2017).

Hypothesis 2: The intervention will positively affect students' time-management skills and effort in studies (Häfner, Obers & Stock 2014).

Hypothesis 3: The intervention will affect students' studying due to the positive relation between students' well-being and their study skills (Asikainen et al. 2019).

Methods

Intervention

A seven-week pilot course was organised for pharmacy students in autumn 2017. The course, which was optional, included two two-hour face-to-face meetings: one at the beginning of the course and one at the end. The meeting at the beginning comprised the course introduction; a psychologist was there to explain the point of the program and the basics of psychological flexibility. Students also responded to the questionnaires. At the end-of-course meeting, students' experiences of the course were discussed, and the students assessed the change in their well-being based on their scores before and after the course. In addition, the students again responded to the questionnaire. The course included individual work on online exercises on a weekly basis for five weeks. The exercises were conducted with an ACT-based online program called "Shift Your Stress" (headsted.com), which

aimed to help students to acquire ACT skills for stress management. The program was developed by ACT-experts together with healthcare and online learning professionals. The exercises in the program focused on five themes: values clarification, values and actions related to studies, mindfulness, coping with negative thoughts and acceptance and self-as-context. The themes were structured in modules that were to be completed at the rate of one per week. The exercises in the program included psychoeducational introductions, experiential exercises and metaphors as text and audio, and exercises in which participants were asked to write down their reflections. For example, in some exercises students were asked to think about important things in life by imagining themselves looking back from the future, practicing mindfulness and concentrating, with different exercises comprising breathing exercises and focusing on and separating harmful thoughts from themselves. In addition to the online program, students completed a time-management assignment in which they were asked to monitor and record their time management for a week and reflect on what they had learnt from it. Students wrote reflective essays at the end of each week and a reflective journal at the end of the course in which they thought about the course and how it had affected their learning.

Participants

The participants were pharmacy students at the University of Helsinki, Finland. Research has shown that pharmacy students tend to adopt rote studying (Nieminen, Lindblom-Ylänne & Lonka 2004; Varunki, Katajavuori & Postareff 2015). Studies have also shown that pharmacy students experience stress, and that there is a need to investigate their coping strategies (Geslani & Gaebelien 2013; Marshall, Allison, Nykamp & Lanke 2008). For these reasons, pharmacy students were chosen as a target group in this pilot course.

Forty-six students completed the course. Not all these students provided a student ID number in the questionnaire at the beginning of the course; thus we could determine that 21 answered both well-being questionnaires, 18 answered both questionnaires measuring organised studying and psychological flexibility and 17 answered to both stress scales at the beginning and the end of the course (Table 1). A total of 21 students gave permission for their reflective journals to be analysed. Forty students reported their experiences of the course using Likert-type questions; 31 students answered the open-ended question concerning the effect of the course on their studying; and 26 students gave open-ended responses to the question about whether the course met its objectives of giving students tools and models of thinking to reduce stress and workload. Of these 40 students, 30 were female, nine were male, and one student did not specify their gender. The mean age of these students was 24 (sd=6.14), with ages ranging from 20 to 49. Seven of the participants had started to study in 2017, 13 in 2016, five in 2015 and seven in 2014. Seven of the students had started their studies before 2014.

Table 1. Themes and measurements used in this study with response rate

Theme assessed	N	Response rate	Instrument
Well-being	21	45,6%	Self-reported well-being (GB-CORE, Evans et al. 2004)
Organised studying	18	39,1%	Organised studying scale (Parpala & Lindblom -Ylänne 2012)
Psychological flexibility	18	39,1%	Modified WAAQ (Asikainen et al. 2018)
Stress scale	17	37,0%	Perceived stress scale (Cohen et al.1983)
Effect of the course on studying	21	45,6 %	Reflective journals of the course
Experiences of the course	40	87,0%	Questionnaire including Likert-type questions
Effect of the course on studying	31	67,4%	Open-ended question in questionnaire
Goals of the course met	26	56,5%	Open-ended question in questionnaire

Instruments

Students’ well-being was measured with the 14-item GB-CORE (Time 1 $\alpha=0.719$; Time 2 $\alpha=0.764$), with scores ranging from zero to 56 (Evans et al. 2004); lower scores denote better well-being. Organised studying was measured using a four-item organised studying scale (Time 1 $\alpha=0.519$; Time 2 $\alpha=0.764$) from the HowULearn questionnaire (Parpala & Lindblom-Ylänne 2012). However, the reliability for the first measurement in organised studying was low. Adding more items would have most probably increased the alpha on organised studying. However, as the scale has been used in many previous studies with good reliability (Herrmann, Koeppen & Kessels 2019; Parpala, Lindblom-Ylänne, Komulainen, Litmanen & Hirsto 2010), it was used in the present study.

Table 2. The scales measuring well-being, stress, organised studying and psychological flexibility

GP-Core (Evans et al., 2005) Time 1 $\alpha=0.901$, Time 2 $\alpha=0.909$	Perceived stress scale Time 1 $\alpha=0.905$, Time 2 $\alpha=0.779$
<ol style="list-style-type: none"> 1. I have felt tense, anxious or nervous. 2. I have felt I have someone to turn to for support when needed. 3. I have felt okay about myself. 4. I have felt able to cope when things go wrong. 5. I have been troubled by aches, pains or other physical problems. 6. I have been happy with the things I have done. 7. I have had difficulty getting to sleep or staying asleep. 8. I have felt warmth or affection for someone. 9. I have been able to do most things I needed to. 	<ol style="list-style-type: none"> 1. In the last month, how often have you been upset because of something that happened unexpectedly? 2. In the last month, how often have you felt that you were unable to control the important things in your life? 3. In the last month, how often have you felt nervous and “stressed”? 4. In the last month, how often have you felt confident about your ability to handle your personal problems? 5. In the last month, how often have you felt that things were going your way? 6. In the last month, how often have you found that you could not cope with all the things that you had to do?

<p>10. I have felt criticised by other people. 11. I have felt unhappy. 12. I have been irritable when with other people. 13. I have felt optimistic about my future. 14. I have achieved the things I wanted to.</p> <p>0= not at all, 1= only occasionally, 2= sometimes, 3= often, 4= most or all of the time</p>	<p>7. In the last month, how often have you been able to control irritations in your life? 8. In the last month, how often have you felt that you were on top of things? 9. In the last month, how often have you been angered because of things that were outside of your control? 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?</p> <p>0=never, 1=almost never, 2=sometimes, 3=fairly often, 4=very often</p>
<p>Psychological flexibility Time 1 $\alpha=0.818$, Time 2 $\alpha=0.827$</p>	<p>Organised studying Time 1 $\alpha=0.519$, Time 2 $\alpha=0.764$</p>
<p>1. I can study effectively even if I have worries. 2. I can admit mistakes I have made and still be successful in my studies. 3. I can study effectively even if I am nervous. 4. My worries do not prevent me from succeeding in my studies. 5. I can do what is required of me in my studies, despite any emotions I may be having. 6. I can work effectively even when I have doubts about myself. 7. My thoughts and emotions do not create an obstacle to studying.</p>	<p>1. I carefully prioritise my time to make sure I can fit everything in. 2. I organise my study time carefully to make the best use of it 3. I put a lot of effort into my studying.</p>
<p>Both scales: 1=totally disagree, 2=partly disagree, 3=in between, 4=partly agree, 5= totally agree</p>	

Psychological flexibility (Time 1 $\alpha=0.818$; Time 2 $\alpha=0.827$) was measured according to the Work-Related Acceptance and Action Questionnaire (WAAQ) (Bond et al. 2013) that had recently been developed for a Finnish university context and found to be a robust instrument (Asikainen et al. 2018; Nieminen, Asikainen & Hailikari 2014). Stress (Time 1 $\alpha=0.905$; Time 2 $\alpha=0.779$) was measured on a scale of 0 to 50 using the Perceived Stress Scale (PSS) instrument (Cohen, Kamarck & Mermelstein 1983). Students' experiences of the course and its effect on their studying was measured with Likert-type questions and open-ended questions about their experiences. Table 2 shows the scales and their reliabilities. The reliability measure of Cronbach's alpha is not always a good measurement; for example, it does not take into account errors or cross loadings (Alwin et al. 2007). Our data is a pilot study in which the data is very small: approximately 20 respondents. Thus, making multidimensional reliability measurements in this case is not an option (Mundfrom et al. 2005).

Analysis

Changes in students' experiences of psychological flexibility, well-being, stress and organised studying were explored with paired sample t-tests and Cohen's *d*. The Likert-type questions about students' experiences of the effects of the course were examined with descriptive statistics. Reflective journals from all the students ($n=21$) who had given permission to use their journals in this study were analysed using inductive content analysis (Miles, Hubermann & Saldana 2015). The purpose of this was to examine how students had experienced this course, and whether and how these experiences had affected their studying. The analysis process, which followed the principles of inductive category development (Mayring 2000), included three phases. First, two authors read through the reflective journals to form a general overview and determine initial categories. It was decided to include in this analysis all the text segments in which students expressed views of how the course had (or had not) affected their studying by giving tangible concrete examples of how their studying had changed. Segments in which students described their studying at a very general level (that is, not applying it to this course or to the exercise) were excluded from the analysis. The first and second author then analysed the reports independently by forming the preliminary categories to capture all the variation in students' comments. These 21 preliminary categories were discussed, and the classification was clarified through intensive negotiations between the two authors. After this, the sub-categories were combined into seven main categories. Both authors independently checked the categorisation and negotiated until there was agreement about the analysis. Finally, the number of students commenting in each category was counted to see which themes they emphasised.

Results

Psychological flexibility correlated positively with organised studying in both measurements. In addition, stress and well-being correlated positively in both measurements. No statistically significant relations between psychological flexibility, stress and well-being was found. The correlations between the measures can be seen in Table 3.

Table 3. Correlations between the measures

	PF1	PF2	ST1	ST2	WE1	WE2	OR1	OR2
PF1 Psychological flexibility	1							
PF2 Psychological flexibility	.32	1						
ST1 Stress1	-.28	-.06	1					
ST2 Stress2	.16	-.14	.45	1				
WE1 Well-being1	-.17	.14	.73**	.45*	1			
WE2 Well-being2	-.06	-.08	.15	.55**	.61**	1		
OR1 Organised1	.46*	.27	-.05	-.21	-.26	-.61**	1	
OR2 Organised2	.52*	.41*	-.22	.22	-.51	.05	.66**	1

*= $p < 0.05$, **= $p < 0.01$

Students' experiences of organised studying and well-being increased statistically significantly during the course (Table 4). The scores on psychological flexibility were higher in the second measurement, but the difference was not statistically significant. Students' experiences of stress decreased but the change was not statistically significant. A large effect was found in organised studying and well-being.

Table 4. The paired-sample t-test results of the change comprising psychological flexibility, stress, organised studying and well-being at the beginning and at the end of the course

	N	Beginning		End		t	p	d
		mean	SD	mean	SD			
Psychological flexibility	18	2.86	0.60	2.98	0.65	-.739	0.47	-0.19
Stress	17	19.59	7.67	18.35	5.78	.705	0.49	0.18
Organised studying	18	3.17	0.59	3.65	0.65	-4.04	0.001	-0.77
Well-being	21	18.14	5.83	13.48	6.10	4.07	0.001	0.82

Students' experiences of the course as affecting their studies

Of the 40 students, 90% ($n=36$) agreed or partly agreed that their experience of the course assignments had been positive and 87.5% ($n=35$) felt that the assignments had been useful to them (Figure 1). A total of 75% ($n=30$) agreed or partly agreed that they had gained skills to manage their studies better and 80% ($n=32$) said that the course had positively affected their studying. In addition, 82.5% agreed or partly agreed that the course aim to provide them with tools and ways to think about how to improve their stress management and well-being during their studies had been met.

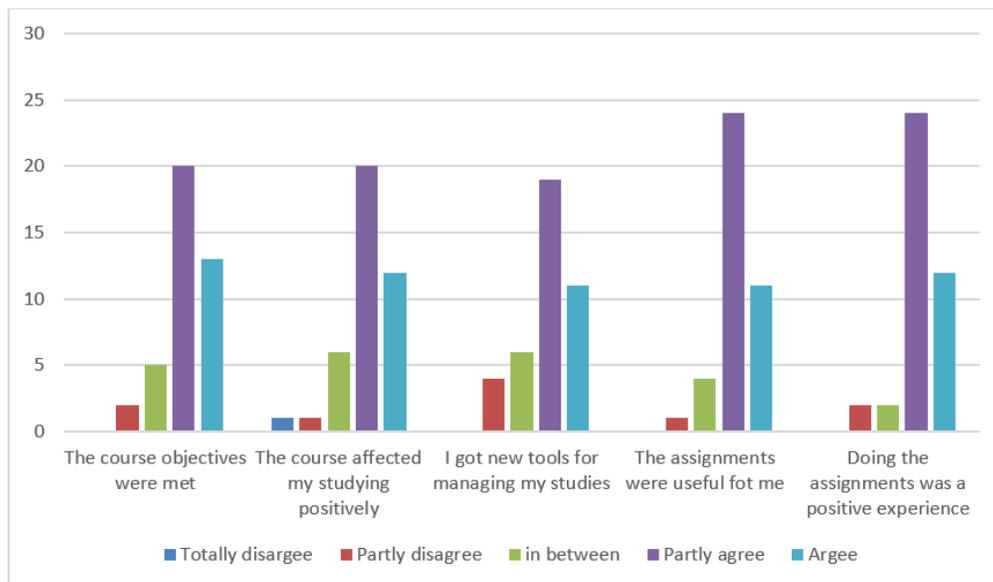


Figure 1. Students' experiences of the course

Open-ended answers

Thirty-one students responded in more detail to the question concerning how the course had affected their studying. Ten felt that their stress levels had decreased, and that they had learnt skills to cope with their stress; ten felt that their thinking about themselves and studying as well as coping with negative feelings had improved; eight reported that their time management had improved; and nine reported that their studying had become more efficient as a result of this course. Five students reported that they were able to focus better in studying. One student reported that the course was not useful at all.

Twenty-six students reported in more detail how this course had helped them in coping with stress. They felt that the course had helped them to reduce their sense of stress, and that they had learnt new ways to think, observe and respond to stressful situations. They also felt that they had learnt skills and exercises to cope with their feelings of stress. One student reported that the exercises were already familiar to her, and one student expressed the view that they expected to learn more about learning techniques in this course. One student's experience was that the exercises helped her to cope with stress generally, but not that much in a study context.

The effect of the course from reflective journals

The qualitative content analysis of students' reflective journals showed that students described similar aspects as in the open-ended responses. Based on the analysis, seven categories were formed to capture students' experiences of the usefulness of this course (Table 5). The table also shows the number of students in each category.

Table 5. Categories describing the effect of the course on studying

Category	N
1. Managing stress	18
2. Improvement of self-knowledge	15
3. Time management	14
4. Recognising and accepting negative feelings and thoughts	14
5. Concentration and being present	14
6. Learning to prioritise	13
7. Managing and being motivated about studying	6

Eighteen students reported that they had learnt tools in this course that fell into the first category, *managing stress*. This category consisted of all the comments in which students expressed the view that they felt they had learnt various tools to cope with the feeling of stress during this course, and that this, in turn, helped them to study and learn better. Students also commented in more detail about the tools that had helped them to cope with stress. During this course students had learnt to recognise the signs of stress, and they reported that they had learnt to understand how stress affected their behaviour and well-being. They reported that they had learnt to face their feelings of stress and share their experiences with other students. Furthermore, the students reported that the exercises practised in this course, such as breathing and concentration exercises, had helped them to cope with stress and to relax, and that they had begun to apply these exercises whenever they felt stress or were in a rush. The following comment is an example of this category:

Due to the course assignments I could relax and remind myself that everything is fine and I can do any study-related assignment, and that I do not have any major reasons to be so stressed.... My thoughts about studying at the moment are very enthusiastic and hopeful. Earlier I felt very anxious and stressed. My experience was that this was the biggest change in me during the course. I still feel a little insecure, but now with the help of the assignments in the course I can take control of the situation and control my stress.

Fifteen students commented on the second category, *improvement of self-knowledge*. This category consisted of students' comments expressing that they had learnt to criticise their previous beliefs about themselves, learnt behaviour models or gained new understanding of themselves. Students often felt that their previous behaviour models had been harmful for them and that becoming

conscious of this had helped them consider their studies in a new way. In addition, students understood which study habits were more useful for them, as reported by this student:

Thanks to this course I have realised that the best way for me to study is to decide beforehand what to study daily and keep these studying aims realistic. I have also noticed that I need enough sleep and exercise in order to study effectively.

Fifteen students commented on the third category, *time management*, stating that during this course they had learnt to better plan their timetables for studying and leisure. The students reported that during this course they had realised how they spend their time in different activities, and they felt that they had learnt to be more realistic with their timetables. They had also realised the significance of following a timetable for their studies. The students felt their studying had improved by being more systematic and effective, which, in turn, enabled them to spend time on other important activities in their lives, as shown by this comment:

After doing the time-management assignment in this course I have started to schedule my studying more than before. Even before this course I tried to think what to do in a week but now I do it in more detail: my studying and when to do it. By doing this more detailed scheduling I have learnt to find time for exercising and being with my family and friends.

The fourth category was *recognising and accepting negative feelings/thoughts*. Fourteen students mentioned in their reflective journals that one significant benefit of this course for their studying was dealing with negative feelings and thoughts. These students reported that they had learnt to recognise the thoughts and emotions that prevented them from learning and studying effectively, and to process these thoughts and emotions. For these reasons, the students felt they were able to study and learn more effectively and feel better during their studies. The students had realised that their thoughts and feelings were only thoughts and feelings in their own mind, and that they did not have to act according to them or believe them. They also reported that they had learnt to question and differentiate themselves from their thoughts and feelings.

Maybe the biggest obstacle for my studying has been that I let my thoughts control me.... In the course I learnt how to face – and perform despite – the negative thoughts. Recognising these negative thoughts and distancing myself from them has helped me in my studying, because they are usually the reason for my procrastination.

The fifth category was *concentration and being present*. The students ($n=11$) described in their journals that their ability to concentrate on studying had increased during the course. They reported that they had learnt to concentrate on one matter at a time, and they had also learnt ways to support their ability to concentrate. Many students wrote about tangible actions that helped them concentrate, such as not using their mobile phones during lectures. The students had also learnt to be mindful and to concentrate better by doing mindfulness exercises, as described in the following example:

I have had a bad habit to do several things at the same time. During this course I practised concentrating on one thing at a time and to exclude all the disturbing issues when I study. The effect on my studying is significant and it is much easier to learn things than before

The sixth category was *learning to prioritise*. This category consisted of all those student ($n=13$) comments in which they reported that during this study course they had tackled the issues and matters that were important to them, and therefore that they had learnt to better prioritise their tasks

and duties. The students had become conscious of the matters that really were important to them and the issues concerning which they wanted to make an effort. They had realised that things other than studying were important to them and that taking care of these things (such as family, friends and one's own health) also helped them in their studies; they had realised that it is not necessary to over-perform and try to achieve the state of being perfect.

Before, I tried to do as much as possible, so I would experience a lot of things in my life. During the course I learnt how I can prioritise my life and choose the things that make me happy. Now I can choose better the things are important to me right now and what I can accomplish later in life. This way I reduce my stress and I can make time for studying, which is very important to me at the moment, instead of focusing on many things at the same time.

The seventh category was *managing and being motivated about studying*. Six students commented on this theme, reporting that this course helped them to acquire new learning techniques and writing skills and increase their study motivation. These students also commented that their thinking about their studies had changed during this course in ways that helped them study.

In my opinion the course was beneficial for my study and stress management...on the other hand the course has maybe had an effect on me as studying has started to feel more meaningful when the stress has reduced.

Discussion

The present study was a pilot study containing a small data set of quantitative and qualitative data. The purpose of this study was to make a preliminary examination of the effects of a web-based intervention course on university students in pharmacy in increasing their well-being and stress management in their studies. One aim was to explore the changes in students' experiences of well-being, stress, psychological flexibility and organised studying with a pre- and post-intervention measurement. Another aim was to explore qualitatively the students' experience of the course's effect on their learning, in order to find out whether this kind of intervention could be used as tool to help support students' well-being and studies.

Based on our results, the students benefited a great deal from the intervention. Our results show that students' well-being increased; this has also been shown in other interventions based on Acceptance and Commitment Therapy (Kashdan et al. 2007; Levin et al. 2017; Waters et al. 2017). In addition to improved well-being, students' stress levels decreased slightly during the course, although the effect size was quite small, and the change was not statistically significant. However, the majority of the students reported that they had learned stress management, which had had an effect on their studies. Students' reflective journals emphasised that they had obtained many tools for stress management from the intervention, and that these tools had influenced their studying. A decrease in perceived stress has also been found in earlier studies concerning ACT interventions (Bond et al. 2013; Puolakanaho et al. 2019; Räsänen et al. 2017). Studies concerning the effect of ACT interventions on university studies have not been conducted, although it seems that this intervention has much to offer to university students. Earlier studies have shown that ACT interventions are successful in promoting well-being in university and college students (Levin et al. 2017; Pistorello 2012; Räsänen et al. 2017). Our study shows that offering a web-based voluntary course based on ACT and other practices can improve students' study skills and well-being. Even though our sample size is small and the intervention was done with only pharmacy students, we can suggest that this intervention has an effect on students' studying and their well-being based on the mixed-methods data of the study. The results could also be applied to other disciplines, because the exercises and

the course are not discipline-specific. The benefits that the students experienced in terms of support for their studying were not specifically related to the pharmacy content they were learning. However, research with larger sample sizes is still needed.

Our quantitative data did not show a statistically significant increase in psychological flexibility, although the mean increased. A reason for this could be the relatively short duration of the intervention, as development in psychological flexibility can be a long process (LaChapelle, Laviorie & Boudreau 2008). Another reason could be the fact that the measurement of psychological flexibility can be challenging. The AAQ questionnaire, which is also the basis for our measurement, has been widely used in measuring psychological flexibility (Hayes et al. 2012; Bond et al. 2013), but there has been some discussion about its construct validity in this context (Wolgast 2014): does it measure psychological flexibility as such, or psychological distress? Despite the non-significant change in the quantitative data, our qualitative data showed in several ways that students felt that many of the processes of psychological flexibility (such as coping with negative thoughts and feelings, concentrating and being present) developed during the course. Students reported that they had learnt tools to cope with their negative thoughts and feelings and to study despite the negative thoughts they might have.

In addition to psychological factors, both the qualitative and quantitative data in this study showed that this course affected how students organised their studying. This is a valuable result, as research has shown that time and effort management is an important component in formal study (Hailikari & Parpala 2014; Rytönen et al. 2012). The time-management exercises in our course proved to be useful, with students reporting improvements in their studying after completing them: they had realised how they spent their time, and they had learnt to do timetables for their studies. They reported that their studying had become more effective than before doing these exercises.

Limitations

There are some limitations to our study. First, its sample size was quite small, and thus there is a lot of uncertainty in our quantitative analysis. The number of students who had given all the information concerning the measurements at the beginning and end of the course and given permission to use their data in the study was very small. This could also affect the correlations, which showed an unexpected lack of the relationship between psychological flexibility and well-being that has been found in previous studies (Kashdan et al. 2006; Räsänen et al. 2016). In addition, the setting of the study was not experimental, and therefore we could not compare the change in these students with a control group. Future research should compare (for example) students in the waiting list for the course to students who participate in it to gather more reliable data about the effects. However, our data consisted of mixed-methods data, which can give a rich perspective to the phenomenon at hand, as it provides different kinds of information (Teddle & Tashakkori 2009). Thus, our qualitative data show similar results to our quantitative data and deepen our understanding about the changes the students reported. For example, almost all students in the course reported positive effects on their studying due to their participation. In future, a larger course should be explored with a proper experimental design. Because participation in this course was optional, a true experimental design was not possible. However, in future, the students could be divided into two courses, in which the other group could serve as the control group.

In addition, our research is based on purely self-reported data, which, particularly in the area of students' well-being and stress management, may not always be reliable. However, our rich data set of both quantitative and qualitative data gave a full picture of students' feelings and thoughts in the course. In addition, we used instruments widely used by psychologists to measure students' well-

being and stress. However, students are not always aware of their own stress levels. In future research, psychological measures could also be used to measure the reduction in students' stress levels.

Practical implications

This pilot study shows that an intervention based on assignments that are designed to improve students' psychological flexibility and well-being with reflective self-assessment assignments can improve their well-being and time management. Although the changes in psychological flexibility and stress were not significant, analysis of the reflective self-assessment assignments shows that students reported that their stress management in studies had improved and they had learned to cope and understand their feelings and thoughts better, concentrate on studies better and be present. This intervention seemed to be beneficial to students, and they acquired many new skills that increased their well-being and the effectiveness of their studying. Previous studies have shown that psychological flexibility is an important component in studying (Asikainen 2018; Asikainen et al. 2018). It is necessary that students' well-being and their skills for monitoring and coping with their feelings and thoughts to be taken into account; this is particularly true for university studies because they will need these skills later in working life. Some of the exercises used in this intervention course could be applied systematically to introductory study courses in higher education. A web-based online course could be easily integrated into studies in virtually any subject area. The importance of supporting students' well-being in addition to expertise has been acknowledged in higher education, and different ways to support students are being developed (Crawford & Johns 2018; Stallman & King 2016). Our results suggest that an ACT-based intervention is one way to support student well-being.

Abbreviations

JMIR: Journal of Medical Internet Research
AAQ: Acceptance and Action Questionnaire
ACT: Acceptance and Commitment Therapy
WAAQ: Work-related Acceptance and Action Questionnaire

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