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Achieving metacognition through cognitive strategy instruction

INTRODUCTION

Learning is an essential part of human life, especially at a young age. We start learning on an instinctive level with our first breath, but only later do cognitive processes develop both naturally, through contact with the external environment, and explicitly, through structured instruction in various educational institutions. These institutions intend to accelerate and improve on the natural learning process. In order to assess the effectiveness of learning, scholars in the educational field have developed a taxonomy (Anderson & Krathwohl, 2001), which presents the learning process as a progressive acquisition of knowledge and skills starting from the remembering and understanding of new information - to the application, analysis and evaluation, and finally, creation of new knowledge which culminates Bloom's learning pyramid (see Exhibit 1).

Various instruction methods have been used to accelerate the progression of a student towards higher levels of learning. In the recent years, several interactive methods gained popularity including flipped classroom (Walvoord & Anderson, 1998), inverted classroom (Lage, Platt, & Treglia, 2000), the case method (Apaydin, 2008), and peer instruction (Mazur, 2009) to name a few. The common feature of these methods is their interactive nature whereby the students interact with instructors and peers, as opposed to just being passive recipients of knowledge in oral or visual form. The key feature of interaction is verbalization of thoughts by the students, which leads to better cognitive comprehension of the concepts. As Karl Weick (1995: p. 176) aptly put it, "we don't know what we think until we hear what we say." Moreover, another important feature of these methods is an immediate feedback from peers and instructors,

which helps students to rectify their misconceptions and organize their new knowledge therefore making it more cognitively accessible in the future. Potentially, this process could lead them to think about their own growing understanding of the material. However, *explicit* thinking about their own learning process and moving from the metaphorical ‘passenger seat’ to the ‘driver seat’ is not part of these methods.

Controlling thinking processes and becoming more aware of one’s learning is called metacognition (Sindhwani, & Sharma, 2013). “A ‘metacognitive’ approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them” (Bransford, Brown, & Cocking, 2000: p. 18). Students’ thinking about their own learning is not an inherent part of the above-mentioned methods. Therefore, an additional component should be added to already quite effective interactive settings to achieve the top of Bloom’s taxonomy faster. In this paper we suggest one possible way to introduce metacognition into a classroom.

The novelty of our research lies in bridging between the metacognitive thinking about learning, and the application of conceptual frameworks learnt in class to issues with which students are grappling in their own lives. We argue that this introspective task enables them to achieve higher levels of Bloom’s learning taxonomy, such as synthesis and evaluation. To our knowledge, such connection was not explicitly covered in previous research on the subject.

The rest of the paper proceeds as following. First, we review the literature on metacognition and propose a research question to address in this study. Then, we present the specific interactive teaching techniques, which the first author implemented in her classroom of senior undergraduate students over the period of three years. Next, we describe the methods used

to evaluate student learning and self-awareness at the end of this course and the cognitive outcomes associated with it. The penultimate part of the paper provides a quantitative analysis of these outcomes. We conclude the paper with a discussion of practical implications, limitations and possible avenues for future research.

LITERATURE REVIEW

Metacognition is generally defined as a higher order thinking which involves active control over your own individual cognitive processes engaged in learning (Bransford et al., 2000); in other words, it is ‘thinking about thinking.’ Metacognitive activities include setting up your own learning goals, planning how to approach a given learning task, monitoring comprehension, and evaluating progress. Metacognition helps us to become successful learners, and is associated with intelligence (Borkowski, Carr, & Pressley, 1987), making it an important subject to study, which could help determine how students can learn to apply their cognitive resources better through a metacognitive control.

The term ‘metacognition’ was first introduced by John Flavell, (1979), who suggested that the process of metacognition consisted of the metacognitive knowledge and metacognitive regulation. Metacognitive knowledge is an acquired knowledge about cognitive processes, which can be divided into three categories: knowledge of ‘person’ variables, ‘task’ variables and ‘strategy’ variables. Knowledge is considered to be metacognitive if it is actively used in a strategic manner to ensure that a cognitive goal (e.g., comprehension of a concept) is met. Therefore, metacognitive regulation is a strategic process of control of one’s own cognitive activities, which ensures that such a goal has been met.

We conducted a **systematic literature review** to assess the state of knowledge about metacognition in the academic literature. A systematic review uses an explicit algorithm, as opposed to a heuristic approach, to perform a search and critical appraisal of the literature. Systematic reviews improve the quality of the review process and outcome by employing a transparent and reproducible procedure (Tranfield, Denyer, & Smart, 2003). Generally, the systematic review process consists of three parts: *data collection, analysis, and synthesis*.

Data collection for the purpose of systematic literature review is different from data collection for the purpose of the study itself; the former process involves collecting articles using key words, while the latter process pertains to collecting actual data to be analyzed. For the purpose of this literature review we gathered data from two main databases: SCOPUS, and the Web of Knowledge. For our search term, we used ‘Metacognition’ to search article titles in these databases. Our initial search yielded 143 entries. We then removed entries that were not published in journals, so that we can be sure that we have full-text access to any selected paper in later phases of this review. We also removed the duplicates that existed in both databases, leaving us with 97 records.

We then proceeded with *analysis* of these publications. The publications were segregated into two groups. The first group included publications that were highly cited. This group contained papers cited 79 times or more. The second group contained recently published research (2008-present), which may not have an opportunity to be highly cited due to its recency. To ensure the quality of the papers, we filtered them based on their journal rankings. Any paper published in a journal that ranked above the average of all the papers (6655) was included in the group. This systematic algorithm (see Exhibit 2) allowed us to identify 16 highly cited articles published in the top journals, which became the basis for our literature review and its synthesis.

The findings of the review are summarized in the *synthesis* of the selected literature, which revealed that the term ‘metacognition’ has been studied in multiple disciplines.

Research into animal cognition revealed possible cases of metacognition undertaken by certain species (Couchman et al., 2012). Dolphins, rhesus monkeys, and apes were tested with multiple non-verbal techniques that, according to Couchman (2012), go beyond the implicit to determine if they have metacognitive abilities. Couchman (2012) concludes from these tests that the aforementioned species do show signs of metacognition. There are some scholars, however, that oppose this conclusion. They argue that the phenomenon observed is simply the animal expressing a first order of thinking, rather than undergoing metacognitive contemplation (Carruthers, 2008). Carruthers (2008) agrees with the opposing arguments and further emphasizes that researchers mistakenly interpreted the results of previous studies. The decisions the animals made may appear to be metacognitive in retrospect, however, when making the decision, the animals are actually undergoing first order of thinking without going into self-reflection (Carruthers, 2008).

In psychology, metacognition has been found to have a statistically significant link to obsessive compulsive disorder (OCD) (Gwilliam et al., 2004). This finding further supports previous models that focused on metacognitive thoughts, rather than the feeling of responsibility, as the central cause of OCD (Gwilliam et al., 2004).

Perhaps one of the most studied aspects of metacognition is its link to education. Flavell (1979) proposed a model for cognitive monitoring that includes metacognitive knowledge, metacognitive experiences, goals (or tasks), and strategies (or actions). His study was concerned primarily with developmental education. According to the author, metacognitive elements

interact and sometimes overlap with each other. Metacognitive experiences, for instance, can form, modify, or delete metacognitive knowledge. Metacognitive knowledge can also be concerned with the combination of person, task, and strategy (identified as a part of the model and as a part of metacognitive knowledge).

Other scholars investigated different subjects and educational uses of metacognition. Kimmel and Volet (2010) studied group learning and how to enhance it. They used metacognition development as one of the measures to evaluate whether or not their techniques had any significant impact on the process. The researchers studied the effects of implementing task interdependence, teacher support, task instructions and small group characteristics on a sample of students. It was found that there was a divergence in metacognition across the two groups of subjects, whereby the experimental group had a positive trend in the development of metacognition when compared with the control group (Kimmel and Volet, 2010).

In the context of education, metacognition was used as a means to improve creativity and originality (van de Kamp et al., 2015). The researchers divided a group of students into a control group and an experimental group. The experimental group was given explicit instructions of metacognition (van de Kamp et al., 2015), while the control group was given a normal lesson. While the results revealed relatively no impact on originality, metacognitive instructions were linked to an improvement in flexibility and fluency (van de Kamp et al., 2015).

Another study in the field of education applied metacognition in a mathematics course. Zaretsky and Bar (2005) utilized data driven dialogue in a mathematics course during two academic years. Their focus was to generate discussions between educators and students to make meaning of academic results, to encourage the use of mathematical language among students in

class, and to improve the learning process. Student's role in the study had a metacognitive side that required them to set goals, self-evaluate, and self-monitor. The study found that the use of metacognition and mathematical language was evident during the data driven dialogues, but the authors concede that two lessons are not enough to generate a proper conclusion.

The aforementioned research especially that in the field of education, studied metacognition mostly as a tool to support their methods, rather than being the end result of these studies. Our paper instead focuses on the tools needed to develop student metacognitive practices that can then be converted into habits and used outside the classroom, in the real world. Thus, the key research question of this paper is: *do specific instructional practices help enhance student metacognition and self-development?* The main tool used for this purpose is a Cognitive Strategy Instruction approach described in the next section.

COGNITIVE STRATEGY INSTRUCTION

In addition to the full spectrum of the interactive teaching techniques mentioned in the introduction (flipped classroom, peer instruction etc.) that can be together labeled as 'an integrative approach,' which combines cognitive and behavioral learning (Inkpen & Crossan, 1995), the first author has introduced Cognitive Strategy Instruction (CSI) in her teaching of 3-credit undergraduate class on strategic management (BUSS249) at the American University of Beirut (AUB). CSI is an instructional approach which emphasizes the development of thinking skills to enhance learning, helping *all* students to become more strategic, self-reliant, flexible, and productive in their learning; in other words, to teach *all* students the abilities previously believed to be utilized by only the brightest few (Borkowski et al., 1987). The CSI approach was developed in addition to the integrative learning method, which combines cognitive and

behavioral learning (Inkpen & Crossan, 1995), as scholars found that simply providing knowledge without experience is not sufficient for the development of metacognitive control (Livingston, 1996).

Three new CSI techniques implemented in the course were:

- **3A Approach (3AA)** (Apaydin, 2014 – see Exhibit 3 for more details) makes the students aware how they will be taught and why, including theoretical explanations of how humans learn (i.e. Bloom’s taxonomy and individual motivation (Maslow, 1987; see Exhibit 4) are explained). Pintrich (2002) stresses that students **must know** about learning strategies, not just practice them, in order to retain those skills. For students to become more metacognitive, they must be taught the concept and its language explicitly (Pintrich, 2002; Tanner, 2012). As a result, students not only become aware of the stages of the learning process, but they also become motivated to achieve the top level not only in Bloom’s taxonomy but also in Maslow’s hierarchy, which is self-actualization.
- **Problem solving algorithm (PSA)** (Mauffette-Leenders et al., 2005) is the core professional skill and the main learning outcome of the strategic management course, which is tested as a part of Assessment of Learning (AOL) and reported for accreditation compliance. PSA includes specific explicit steps of problem identification, prioritization, root cause analysis, alternative solutions development, decision criteria identification, and alternative evaluation and implementation. The metacognitive part of the instruction involves making students **aware** of these specific steps, as opposed to just practicing them using, for example, a case method. Continuous repetition of these steps throughout the course intends to develop an eventual cognitive ‘automation’ of the decision-making process bringing it to the level of expert intuition (see Simon, 1997).

- **Self-reflexivity exercise (SRE):** at the beginning of every class, individually, students should write down three most important new things they learned in the previous class, and then discuss them with their neighbor (in pairs), and finally discuss them with the whole class. This exercise activates several stages of Bloom's taxonomy, from low levels of comprehension during individual recollection of the material to higher levels of analysis and evaluation, which is done during discussion in pairs and in class (Tanner, 2012: p.117). SRE enables the students to realize that they didn't know what they didn't know: acknowledging meaning and usefulness of the new material and clarifying any misunderstanding about it through a discussion.

In summary, CSI metacognitive techniques add to an already interactive course and shift the responsibility for learning from the instructor to the student. First, the student becomes motivated (by 3AA) to reach the top lever of Bloom's and Maslow's pyramids that s/he is now aware of. Then s/he understands what is needed to be learned (PSA) and practices it through an action (3rd A of 3AA) of case method. Finally, s/he reasserts and clarifies the learning through SRE, thus achieving a higher level of metacognition while *continuously being aware* of his/her learning progress, which represents an excellent positive motivation to proceed.

HYPOTHESES DEVELOPMENT

According to Bansford et al. (2000), metacognitive practices increase students' abilities to transfer or adapt their learning to new contexts and tasks. Accordingly, we expected the students to be able to effectively apply strategic management course concepts such as PSA and SWOT (strength/weaknesses/opportunities/threats), which they had practiced on themselves during case solving exercises involving organizations, introspectively. Moreover, we expect

them to do a better job (more detailed, more profound responses). More so than the control group which was not exposed to the CSI method.

H1. Students who are taught using CSI will have more detailed and profound answers than their peers in the control group.

Furthermore, according to Ocasio (1997), humans have limited attention capabilities and can focus only on a handful of issues at a time. We argue that students who were subject to CSI will be focusing more on self-development and intrinsic qualities and will think more strategically i.e. focusing on long-term rather than short- or medium-term issues.

H2a. Students who are taught using CSI will focus more on their self-development than their peers in the control group.

H2b. Students who are taught using CSI will focus more on long-term issues than their peers in the control group.

Metacognitive practices help students become aware of their strengths and weaknesses (Bransford et al., 2000). A key element is recognizing the limit of one's knowledge or ability and then figuring out how to expand that knowledge or extend the ability. 3AA and SRE explicitly train students to be more self-aware and be able to identify their strengths and weaknesses and get insights about their intellectual and social deficiencies. Therefore, we expect that the students will be able to identify more areas of improvement (W of SWOT) than their peers in the control group will and more clearly articulate their competencies.

H3. Students who are taught using CSI will be able to identify more issues and weaknesses than their peers in the control group.

H4. Students who are taught using CSI will be able to identify more competencies than their peers in the control group.

Metacognition helps us to become successful learners, and it has been associated with intelligence (Borkowski, et al, 1987). Therefore, we expect better overall class performance from CSI students.

H5. Students who are taught using CSI will have a better overall class performance than their peers in the control group.

METHOD

We used qualitative interpretivist approach method (Garfinkel, 1967) in this study. This approach relies heavily on naturalistic methods such as observation and text analysis and ensures that the researchers interact with study participants in order to collaboratively construct a meaningful reality. As a result, the meaning is emerging from this process. Mainly, we used content analysis technique described in the following sections to arrive at this meaning.

We used Angen (2000) guidelines to ensure the quality of our research. As such, we made sure that 1) the research question was carefully articulated; 2) a written account of development of persuasive arguments was translated into hypotheses; and 3) articulation of the choices and interpretations between the researchers was made during the inquiry process. After deciding on the general approach, we proceeded with data collection as described in the next section.

DATA COLLECTION

To test whether the students indeed reached the top level of Bloom's and Maslow's pyramids, a 'blank page' exam was administered at the end of the semester. While the course covered strategic management in organizations, and PSA and SRE were applied to the issues pertaining to organizational context during the whole semester, the final 'blank page' exam required students to think about themselves. Suddenly, they had to apply organizational concepts to their own lives. For some it was quite a shock. Several reported that it was "eye-opening," "revealing" and, generally, was not easy. This final exam asked the students to be inquisitive, self-aware and systematic about personal values, judgement criteria and personal issues they were facing at the time of graduation from an undergraduate program. Students were presented with a blank paper and the following questions on the auditorium screen:

- Identify your personal values, mission and vision in life (3AA);
- Identify 4 immediate personal issues you're currently facing and prioritize them (SRE);
- Conduct root cause analysis, suggest alternatives how to solve your most urgent and important issue, and select the best alternative using a self-determined set of decision criteria (PSA); and
- Develop an implementation plan (3rd A of 3AA).

This exam can be compared with a common assignment in English composition courses. It is a self-assessment essay in which students apply course criteria to articulate their strengths and weaknesses. However, the CSI assignment in this study attempts to reach deeper into the students' underlying values and motivations that get translated into intentions and actions.

The study lasted from Fall 2013 to Summer 2016, and all students enrolled in the strategic management course, taught by the first author of this paper, participated in this study.

Eight sections of BUSS249 from Fall 2013, Spring 2014 and 2016, Summer 2014, 2015 and 2016 completed this assignment (179 students in total, 99/80 male/female ratio). See Table 1 for more details about the sample breakdown. Cumulative GPAs and class grades were available for all of these students.

PLACE TABLE 1 AROUND HERE

The exam was hand-written by the students on blank papers which were collected and coded for the analysis as explained in the next section.

The data for the control group, not exposed to CSI, were collected via an online survey in Summer 2016. The survey was posted on a student online group and sent out by the other instructors teaching senior courses. It was also administered to students registered to take the course during Summer 2016 on the first day of class. Overall, 34 answers were collected. Four of them had to be removed because of incomplete data, leaving 30 valid respondents (13 females/17 males) in the control group.

DATA CODING AND ANALYSIS

We used content analysis in this research. Content analysis is defined as a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Berelson, 1952; Stemler, 2001; and Weber, 1990). Content analysis enables researchers to sift through large volumes of data with relative ease in a systematic fashion (Stemler, 2001). It can be a useful technique for allowing us to discover and describe the

focus of individual, group, institutional, or social attention (Weber, 1990). Content analysis is also useful for examining trends and patterns in documents. It also allows inferences to be made which can then be corroborated using other methods of data collection. It has the attractive features of being unobtrusive, and being useful in dealing with large volumes of data.

It is customary that content analysis starts with coding and categorization. According to Weber (1990: p. 87), "a category is a group of words with similar meaning or connotations." Categories must be mutually exclusive and exhaustive, i.e. when no unit falls between two data points, and each unit is represented by only one data point (Stemler, 2001). Given that it was a study of student self-awareness, we decided to go with an *emergent* coding since *a-priori* coding would require having specific theory-based coding categories. We followed the standard steps of emerging coding method.

First, two co-authors independently reviewed the material and came up with a set of features that form a checklist. Second, we compared notes and reconciled any differences that showed up on their initial checklists. Third, we used a consolidated checklist to independently apply coding. Fourth, we checked the reliability of the coding and repeated the steps until it reached a 95% threshold as suggested in the literature (Stemler, 2001).

Our study included the following sampling units: 1) personal issues; 2) personal values, 3) decision criteria; and 4) student self-declared competencies. Since the students could provide more than one answer for each question, the number of sampling units varied across sampling units. See Table 2 for more details.

PLACE TABLE 2 AROUND HERE

Personal issues were categorized into 28 mutually exclusive groups, and a higher level of mega-categories as well as their time orientation (short/medium/long term). Decision criteria were similarly analyzed and categorized into 21 mutually exclusive groups. The same categorization exercise was applied to student competencies, resulting in 16 categories. Results were additionally analyzed by gender. The next section presents the results of this analysis.

We did the preliminary pilot testing on a Summer 2016 group of students who were subject of both, a pre-course survey and then post-course ‘blank page’ exam. The results of this pilot test revealed significant differences in answers, confirming the validity of our control group. Therefore, we proceeded with our analysis of means between this group and the total sample which underwent experimental treatment in this study.

RESULTS

Main conceptual findings of this study were synthesized using the content analysis method described in the previous section, while proposed hypotheses were tested using a variation of means between the study group and the control group. We present the results of this analysis below.

Depth and degree of response details

We hypothesized that the CSI group will exhibit more depth in their responses than the control group. The CSI group identified on average 3.97 issues, 3.0 criteria, 3.04 values and 1.87 competencies, while the control group has provided fewer responses (with the exception of competencies) supporting our H1 (See Table 3). The fact that the control group listed fewer

competencies after the course shows their improved critical thinking and self-evaluation. While the number of listed competencies decreased, the types of competencies become more concrete (as explained in the ‘competencies’ section below).

PLACE TABLE 3 AROUND HERE

The nature of personal issues identified

We hypothesized that CSI group will focus more on self-development and long-term issues than the control group. Out of 712 issues presented in CSI student responses, 5 were unclear, resulting in 707 issues available for analysis. The summary of the replies is presented in Table 4.

PLACE TABLE 4 AROUND HERE

Using the word cloud method, we can see that the topic on the “top of their mind” is job/work and future studies (graduating from the current program and continuing with a master’s program). See Figure 1.

PLACE FIGURE 1 AROUND HERE

However, a detailed analysis, classification and categorization of the data revealed a more profound focus on self-development, which came second just after “studies.” It is quite striking that character and personality represented the most significant (14%) among 28 identified categories. Items included in this category represent self-retrospection and can be associated with strive for self-development and self-actualization.

In terms of time orientation, there was a balance between short-term issues (“now”), medium-term (immediate future, next months) and long-term. However, female students tended to be more short-term oriented than male students. See Figure 2.

PLACE FIGURE 2 AROUND HERE

Overall, significant gender differences (more than 50%) were found in 12 categories (210 issues). Male students displayed more focus on employment, work-study trade-off after graduation and were thinking more about starting a family. On the other hand, female students were more uncertain what to do after graduation, were considering entrepreneurship more than their male peers, and focused more on work-life balance, social life, and immediate purchases. See Figure 3.

PLACE FIGURE 3 AROUND HERE

In terms of urgency/importance ranking, 'work' and 'self-' meta-categories were deemed to be the most urgent and important with current studies/internships dominating the immediate issues (3.1 rankings). See Figure 4. Here again, we can see the tendency of the female students to rank short-term issues as more urgent/important while the male peers leaned more towards long-term issues. See Figure 5.

PLACE FIGURE 4 & 5 AROUND HERE

When compared with the control group, the CSI group, as hypothesized, exhibited more focus on self-development (29% vs. 27%) and long-term orientation (32% vs. 28%). As the control group provided significantly less detailed answers than the CSI group (see H1), and given a smaller sample of the group (30 respondents), a more detailed analysis of the control group similar to the one for the CSI group presented above was not conducted. Instead, control group results were used only for the overall benchmarking purposes.

No significant differences were found between groups in terms of types of issues that they were focusing on. The top ones being:

- Character and personality
- Career and employment
- Current and future studies
- Leaving Lebanon

- Behavioral skills

Personal values

We haven't hypothesized about the differences in personal values between the CSI and control group, as it was not a part of the theorizing in this paper. Instead, we took an exploratory approach to this subject.

The analysis of personal values revealed the equal emphasis on self and others in moral orientation, with honesty and integrity being the largest category representing one quarter of all responses. Commitment/hard work and respect/understanding represented together another quarter. Other values were more fragmented. See Table 5 & Figure 6.

PLACE TABLE 5 AND FIGURE 6 AROUND HERE

Gender analysis highlighted interesting significant differences in declared values. While male respondents appreciated intellect, learning and modest behavior, female students valued respect, understanding and piety more. See Figure 7.

PLACE FIGURE 7 AROUND HERE

Decision criteria

Selection of decision criteria is a part of the PSA process, which enables students to discriminate between available alternatives and eventually choose the most preferable one. We consider decision criteria to be an extension of the personal values, and thus they were analyzed accordingly.

Out of 537 criteria selected by students to evaluate their alternatives for identified issues, 30 were unclear and thus were excluded from the analysis. Out of the remaining 507, pragmatic considerations such as time, cost and ease of implementation were on the “top of the mind” according to the word cloud analysis, with a secondary “silver lining” of satisfaction, happiness and experience. However, a more detailed analysis highlighted more profound issues. While implementation came at the top, as it was in the word cloud analysis, the second most important category was achievement of the tangible outcomes. Personal and social outcomes and personal development took approximately equal share of 10% each. These three categories can be related to Maslow’s levels of needs 3, 4 and 5 (belonging, esteem and self-actualization). See Figure 8.

PLACE FIGURE 8 AROUND HERE

When compared with the results of H2, we can see that when identifying issues, self-actualization topics are more frequent (27%); however, when used as a criterion their share drops to 7% and more pragmatic considerations become a priority. This indicates a significant gap between aspirations, or espoused theories vs. theories in action (Argyris & Schon, 1974). When people are asked how they would behave under certain circumstances, the answer they usually give is their espoused theory of action for that situation. This is the theory of action to which

they give allegiance, and which, upon request, they communicate to others. Nevertheless, the theory that actually governs their actions is their enacted theory, which may or may not be compatible with their espoused theory. The individuals may or may not be aware of the incompatibility of these two theories. Therefore, in our case, there was a clear gap between student awareness about self-actualization and its importance, and their decision criteria. Simply put, the students are not mature enough to use self-actualization as a criterion for selecting alternatives for action.

Finally, the analysis has revealed gender differences in selecting criteria, which were significant in 8 out of 21 categories. Interestingly, male students gave priority to more family related criteria than females. On the other hand, females placed more importance on character and personality, personal and reputational criteria. See Figure 9.

PLACE FIGURE 9 AROUND HERE

Competencies

In answering this question, students mostly focused on their future employers. When analyzed using the word cloud, we can see that the prevalent phrase being used is “hard work.” A more detailed analysis revealed three broad categories of assets that students believe they can offer to their future employers: character/personality, behavioral and cognitive skills.

It is interesting to note that cognitive skills which students usually acquire in a university, come at the bottom of what they believe will be of value for the employers. The top two qualities

they offer are work ethics (or “hard work” as noted in the word cloud chart) – 15% of total, followed by high character (15%) and social skills (including teamwork) – 11% (See Table 6 & Figure 10.)

PLACE TABLE 6 AND FIGURE 10 AROUND HERE

As with previous answers, there was a significant gender difference in some responses. While male respondents focused on work ethics, female students seem to emphasize on education, experience and motivation (no male respondent mentioned any of these categories). See Figure 11.

PLACE FIGURE 11 AROUND HERE

We hypothesized that CSI group will be more aware of its strengths (competencies) and will be able to describe them in more detail. The results of the study are somewhat different. The CSI group identified on average 1.87 competencies per person, while the control group had about 3.26. However, the fact that the control group listed fewer competencies after the course, shows an improvement in their critical thinking and self-evaluation. Moreover, competencies of the control group seem to be more generic, in line with employers’ expectations, while CSI group exhibited more unique competencies such as familial ties, and cultural background.

Performance

We investigated the relationship between values, issues and performance in CSI group and compared their performance with that of the control group.

In terms of the relationship between declared values and performance, we used two measures of performance: cumulative GPA and class contribution grade. The analysis revealed that those students who had work-related values, had the highest cumulative GPA (79%) and highest contribution (68%), followed by those who focused on self, with the lowest being those who focused on others (62% contribution). There was no difference found between genders in this analysis category.

In terms of the relations between issues and performance, students who identified issues with work-life balance and country of residence trade-off, had the highest GPAs (above 82%), which is possibly a reflection of a lot of studying at the expense of social life. The lowest GPA (75.97%) was an attribute of students who had issues with vices and addictions (perhaps quite expectedly).

Although we hypothesized about possible differences between CSI and the control group in terms of performance, with the CSI group expected to be higher as a result of their exposure to metacognitive techniques, we did not find a significant difference between them. This result can be possibly explained by the self-selective nature of the control sample. Given that no reward was offered to the control group participants, we can assume that only intrinsically motivated students would donate their time to participate in this survey. Thus, we may expect that such students would already have higher than average GPAs, bringing it closer to performance of CSI group.

Summary

We found general support for our hypotheses with an exception of the performance improvement. We could clearly see that after applying the CSI method, students were able to identify and express more issues, values, decision criteria, and personal competencies than before.

Issues. In comparison with the control group, the CSI group reveals more focus on employment future studies, finance, lodging, and time management. This indicates a shift towards more immediate issues, thus pointing out that students were able to better reflect about their own personal issues and frame them into concepts gained from the class (taught using the CSI method).

Values. After being exposed to the CSI method, students seemed to shift towards honesty and integrity. Students also left fewer blank answers. This could indicate that students became more capable at self-introspection and able to better identify their personal values and beliefs.

Decision criteria. The students demonstrated a shift towards more practical criteria, such as material rewards, personal finance, and ease of implementation. The respondents also left a lot fewer blanks after being exposed to the CSI method.

Personal competencies. When comparing the competencies that the students identified, we noted spikes in certain categories such as character, creativity, ethical values, and social skills (as compared to the control group). This represents a shift from what students believe that employers want to hear to a more profound examination of their own competencies and strengths.

Overall, our study demonstrated that the CSI method leads to higher metacognition manifested as more detailed and attentive self-examination, higher self-awareness and more attention to self-development and long-term orientation. Significant gender differences, although not an explicit part of this study, were uncovered and could provide fruitful avenue for future research.

DISCUSSION

Limitations

This research has several limitations associated with both the method and the nature of the data. First, the reliability of content analysis depends on the correct definitions of categories and non-mutually exclusive and exhaustive categories. Only two raters developed and reviewed the categories. Increasing the number of raters would potentially increase the reliability and validity of this study. Second, the data were collected in one higher education institution (AUB) in one Middle Eastern country, Lebanon. AUB is known for high quality of its students and their near-native fluency in English. Therefore, similar studies conducted in different settings could produce different results. Moreover, the metacognitive approach was used within the boundary of a business course with its own learning objectives, so the results may not be generalizable across disciplines. Finally, the control group was created simultaneously with the last semester of the main group respondents. It is possible that respondents from the previous years may be different due to unidentified reasons (such as different high school graduation requirements from year to year on the national level etc.) from the control group respondents. Moreover, since the control group was self-selected, it might lead to a performance bias in this group.

Implications

This research has practical implications for improving self-awareness and metacognition of the students. The addition of an unexpected self-applied perspective and application of PSA to themselves enables the students to see the value of otherwise abstract concepts presented in the textbooks and forgotten after the semester is over. Self-aware students can present themselves better in job interviews, as they already know their core competencies and issues to work on, which are similar to ‘strengths and weaknesses’ questions interviewers usually ask. Without a doubt, the ‘weakness’ question is the one usually dreaded the most; and students who went through the CSI training certainly know better how to handle it. They also have the necessary cognitive awareness and vocabulary to talk about themselves critically and discuss their own values and personality with recruiters in a more mature fashion.

Our study also has important implications for universities and educators in general. Explicitly teaching metacognition and self-development should be a predecessor to any university course in order to enhance student learning outcomes. Moreover, this study also has the potential to change the way human resource managers and business leaders interact with employees. Current practices utilize goal setting and evaluations to help improve employee performance and to encourage growth. While these rudimentary techniques may lead to improved performance, our study proposed new tools that can benefit employees, making them more aware and more intrinsically motivated, and thus empowering leaders to guide their workforce in a more agreeable and effective way.

Future Research

Future research can extend this study to other contexts such as different disciplines and countries, and investigate gender differences uncovered in this study. Gender differences may be

a particularly interesting topic to study as our results reveal some counter-intuitive findings. When examining issues, male students had more focus on employment, work-study trade-off after graduation and were thinking more about starting a family. On the other hand, female students were more uncertain what to do after graduation, were considering entrepreneurship more than their male peers, and work-life balance, social life, and immediate purchases. Gender differences were also found in values, for instance, male respondents appreciated intellect, learning and modest behavior, while female students valued more respect, understanding and piety. Interestingly, gender analysis of criteria revealed that male students gave more priority to family related criteria than the females. On the other hand, female students placed more importance on character, personality, personal and reputational criteria. Finally, in terms of personal competencies that students believed they could offer to the future employers, we discovered that while male respondents focused on work ethics, female students seem to emphasize education, experience and motivation (no male respondent mentioned any of these categories). Future research in this area can be further extended in both, university context, and working environment. It can also be suggested to conduct a longitudinal study to evaluate the changes taking place in young professionals in terms of their values and aspirations before and after graduation, as well as a few years into their professional career.

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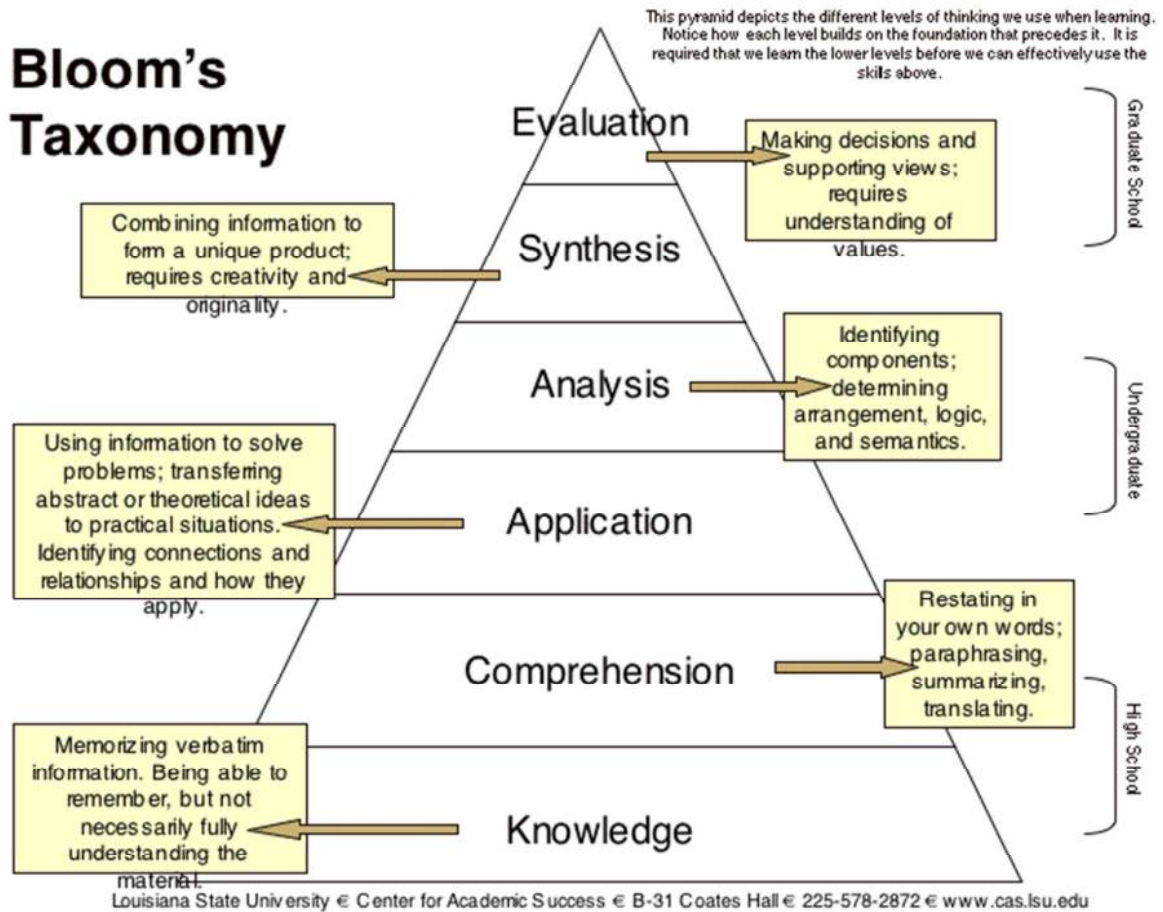
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Exhibit 1



Source: Anderson LW and Krathwohl D (2001). *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives*. New York: Longman.

Exhibit 2. Systematic literature review algorithm

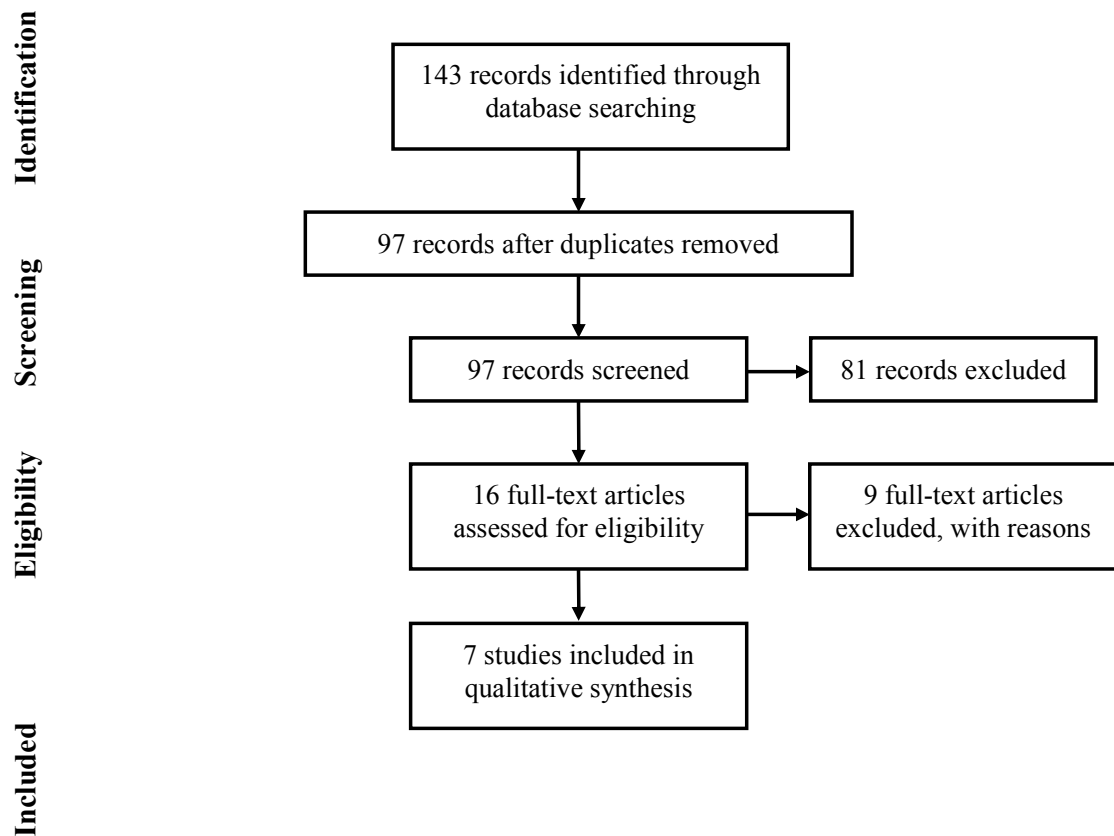
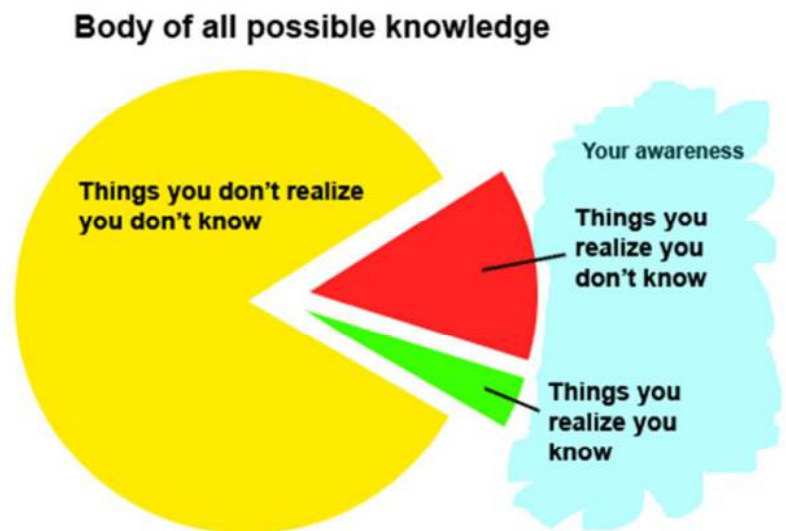


Exhibit 3

The 3A Approach

Management literature has firmly established that the process of knowledge creation and transfer involves the stages of environmental scanning for data collection, interpretation and meaning making, learning through action taking, codification, replication and reutilization. The 3A Approach combines these stages into three succinct A's:

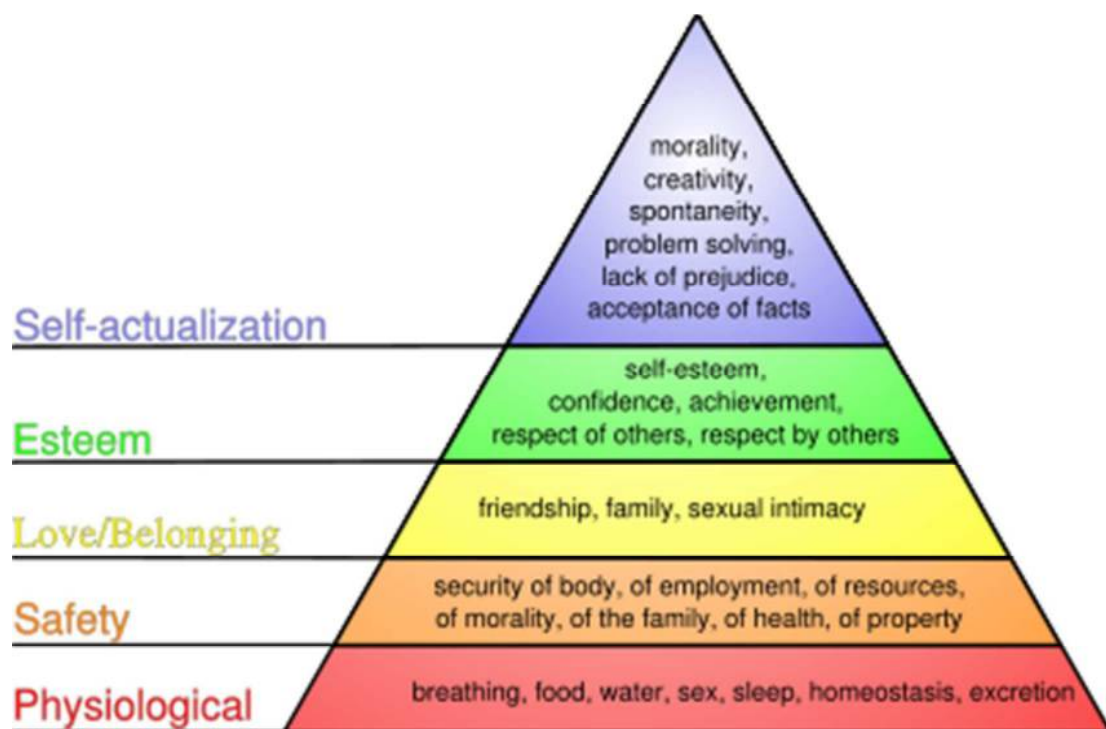
- **Awareness** refers to a pro-active scanning of the environment and noticing potentially beneficial opportunities in it. We know what we know and what we don't know, but the amount of things we don't realize that we don't know is much larger than the first two. Practicing awareness helps decrease the space of knowledge you don't realize that you don't know. In the context of a classroom, student achieve awareness through traditional methods of textbooks and lectures with the difference that first, they learn that this is just the first step so that they become aware of the whole learning cycle.
- **Analysis** refers to an evaluation of identified opportunities in terms of their expected benefits and drawbacks using a systematic and logical problem solving approach. This is the key skill required in any kind of managerial job. Being able to construct arguments and develop solutions is the basis of success in business. This is a typical case-method approach as practiced in the leading western business schools.
- **Action** refers to pro-active implementation of the decisions students have taken and solutions they developed. More often than not, our ideas remain unrealized because we fail to act in a timely fashion and miss the window of opportunity. This is a purely behavioral activity where learning moves from potentiality to actuality in Aristotelian sense. In this phase, students enact their decisions through a role play or quasi-consulting assignments with local companies.



Source: Apaydin, M. (2014), "The 3A Approach: Implementing Practice-Based Interactive Learning Methods in the Middle East," in *Leadership Learning for the Future*, Information Age Publishing Inc., Ch 6: 87-93.

Exhibit 4

MASLOW HIERARCHY OF NEEDS



Source: Maslow, AH *Motivation and Personality*. (1987) 3rd ed., Chapter 11 "Self-Actualizing People: A Study of Psychological Health." New York: Addison-Wesley Longman, Inc.

Description	Female	Male	Total	Average GPA
F2013	24	19	43	78.94
S2014	18	25	43	80.47
S2015	9	15	24	77.06
Su2014	10	6	16	76.77
S2016	9	17	26	80.23
Su2016	10	17	27	76.68
Grand Total	80	99	179	78.71

Table 1. Descriptive statistics of the study sample

	F	M	Total
Issues	323	389	712
Personal Values	241	287	528
Decision Criteria	243	294	537
Competencies	156	180	336

Table 2. Descriptive statistics of sampling units

	Issues	Criteria	Values	Competencies
CSI	3.98	3.00	3.04	1.88
Control	3.43	2.80	2.91	3.27

Table 3. Average number of items in control and experimental groups

	Short-term	Male	Female	Total	Medium-term	Male	Female	Total	Long-term	Male	Female	Total	
Self	Time management	18	13	31	Behavioral skills	9	10	19	Character and personality	62	38	100	
	Physical health	2	8	10	Psychological health	6	14	20	Vices and addictions	8	1	9	
Studies	Current studies	26	15	41	Post graduation uncertainty	13	10	23	Future studies	28	24	52	
	Cognitive skills	4	4	8	Work-study trade-off	5	10	15				0	
Work	Internship	3	6	9	Employment	44	29	73	Career	17	12	29	
	Family business	8	4	12	Entrepreneurship	16	5	21				0	
Location	Lodging	6	8	14	Leaving Lebanon	16	20	36	Country trade-off	9	10	19	
Social	Family issues	12	22	34	Starting a family	5	6	11				0	
	Romance	14	13	27	Social life	16	6	22				0	
Leisure	Work-life balance	1	5	6	Vacation plans	7	11	18	Sports and fitness	10	9	19	
Material Issues	purchases	8	6	14	Personal finances	13	2	15				0	
Gender Diff/%		-2%	102	104	206	20%	150	123	273	35%	134	94	228

Table 4. The summary of issues by type, time orientation and gender

	Male	Female	Total	
Self	Balance and health	3	1	4
	curiosity and learning	2	8	10
	Ethics	9	14	23
	Happiness	2	2	4
	Honesty and Integrity	63	77	140
	Independence and confidence	4	7	11
	Intellect	2	4	6
	Piety	7	3	10
		92	116	208
		23	16	39
Others	Compassion and altruism	23	16	39
	diversity and equality	8	12	20
	Family, Friends, and Loyalty	16	23	39
	modesty	2	6	8
	Positivity and social orientation	14	17	31
	respect and understanding	28	27	55
		91	101	192
		7	7	14
		32	46	78
		2		2
Work	diligence	6	5	11
	Excellence and quality	8	7	15
	Leadership	1	1	2
	Patience and discipline	2	4	6
		58	70	128
Total	241	287	528	

Table 5. The summary of personal values by type and gender

		Male	Female	Total
Self	Cognitive skills	18	15	33
	Knowledge	8	5	13
	Education	3	10	13
	Creativity	4	6	10
	Cultural Sensitivity	6	5	11
	24%	39	41	80
Others	Behavioral skills	8	12	20
	Work ethic	34	17	51
	Social skills	17	19	36
	Experience	0	7	7
	Leadership	7	1	8
	36%	66	56	122
Character	Character	32	20	52
	Ambition	11	11	22
	Ethical Values	19	19	7
	Motivation	4	4	8
	Work Quality	9	5	14
	40%	75	59	134
Total		180	156	336

Table 6. The summary of personal competencies by type and gender

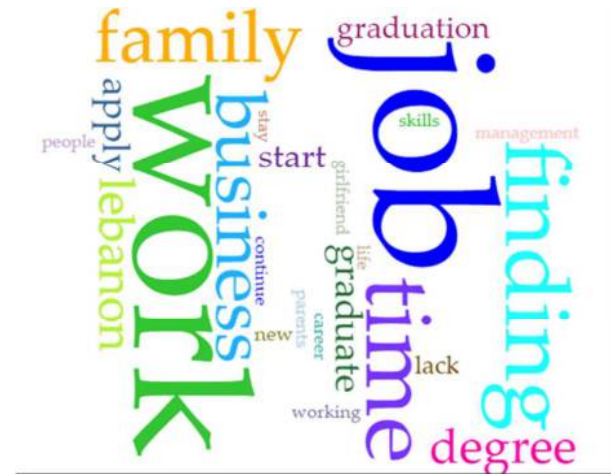
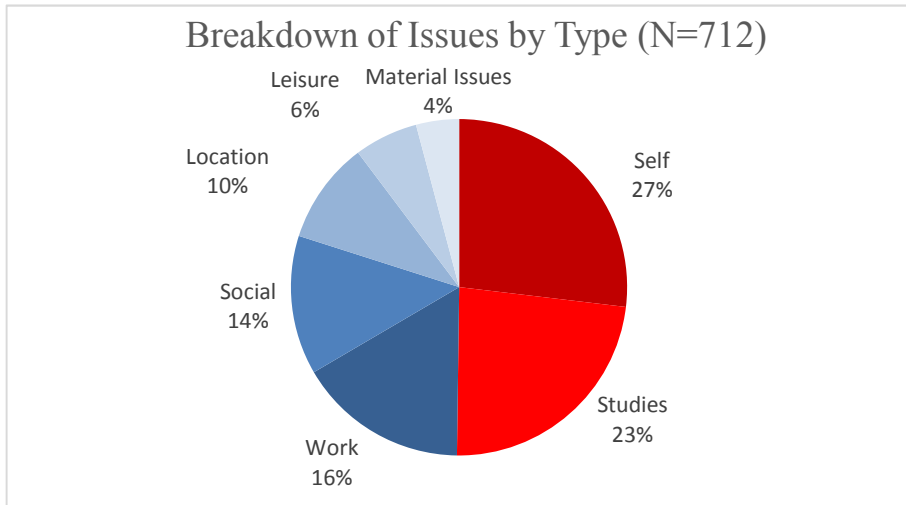


Figure 1. Breakdown of issues by type

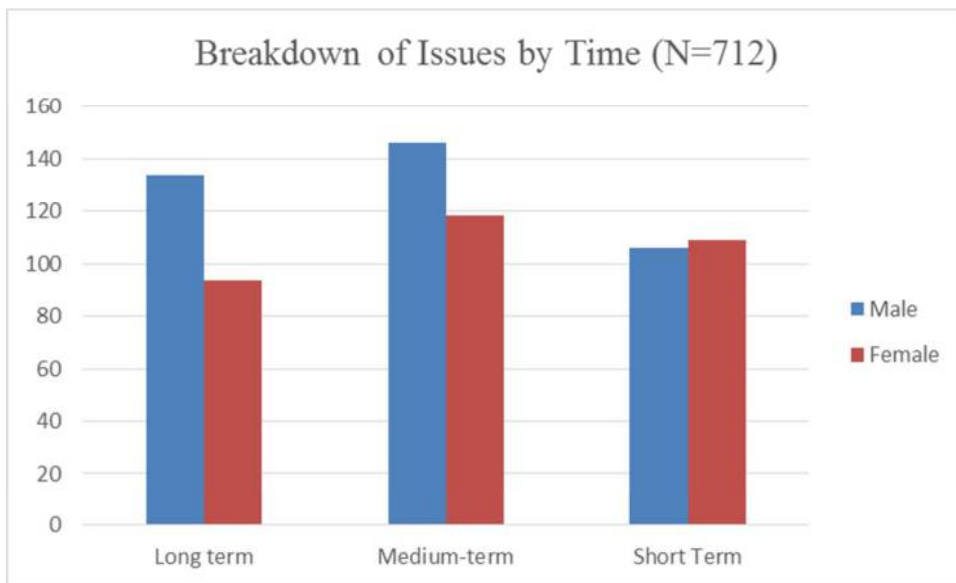


Figure 2. Breakdown of issues by time orientation

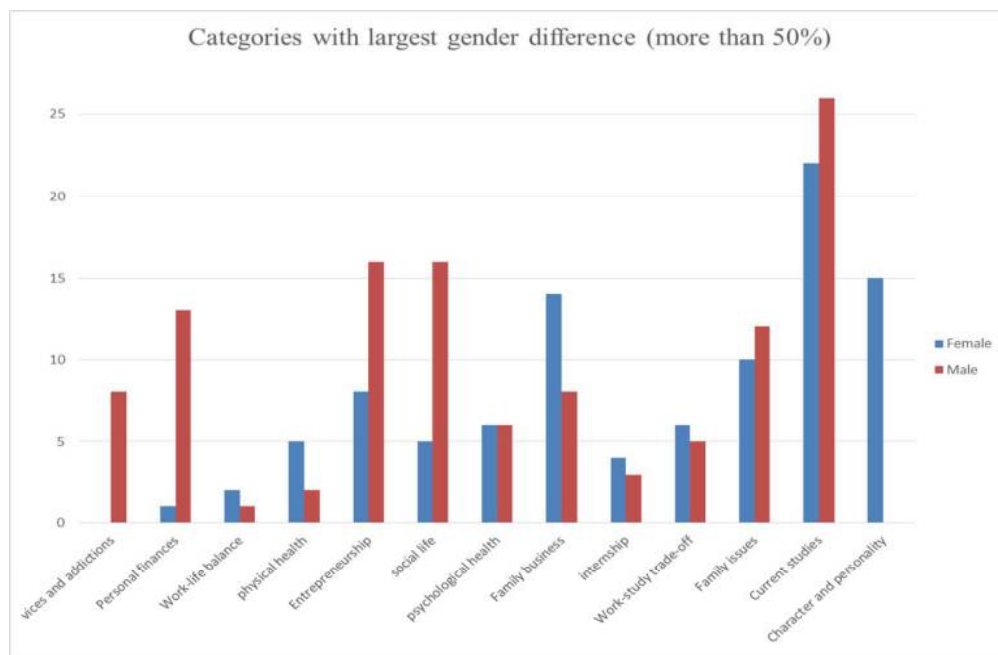


Figure 3. Issues with significant gender differences

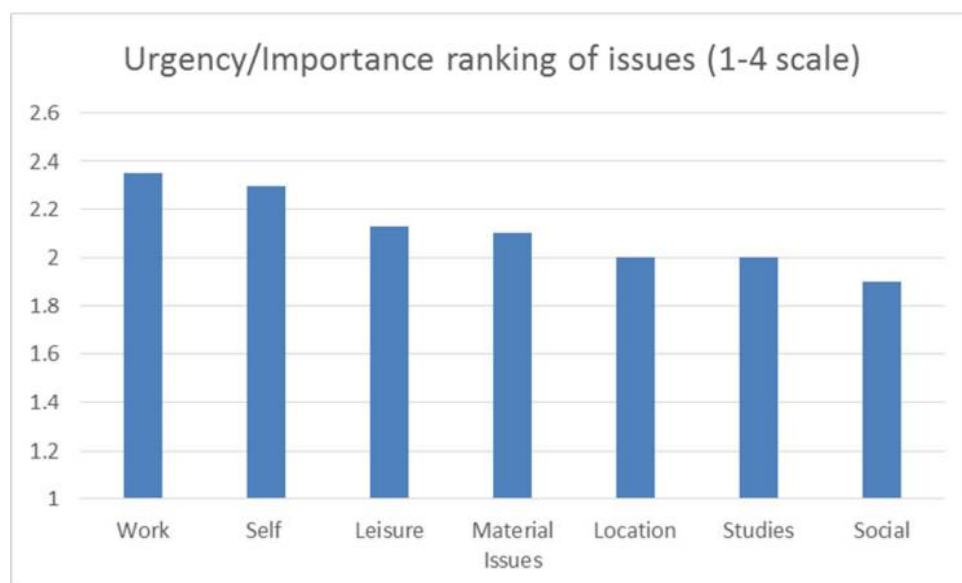


Figure 4. . Urgency/importance ranking by issue types

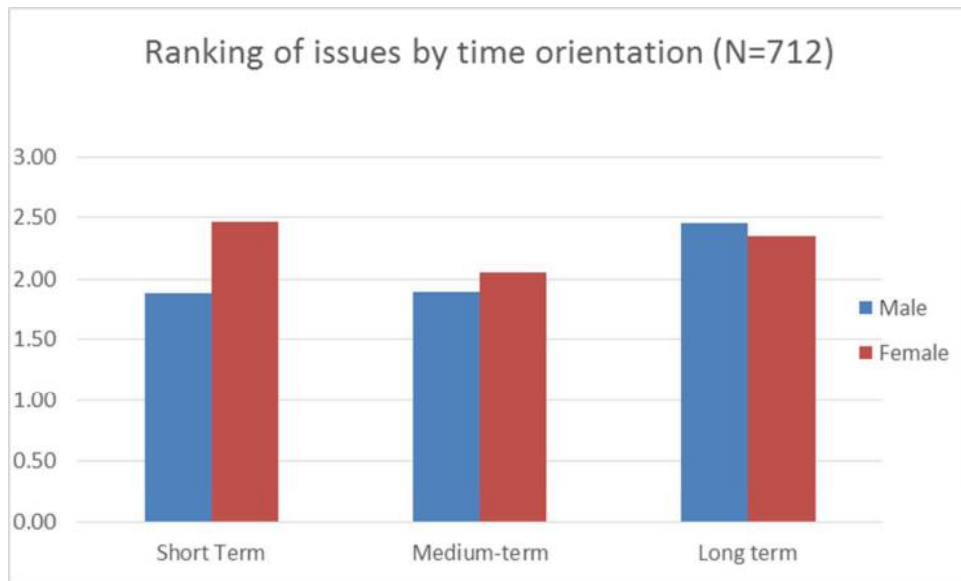


Figure 5. Ranking of issues by time orientation

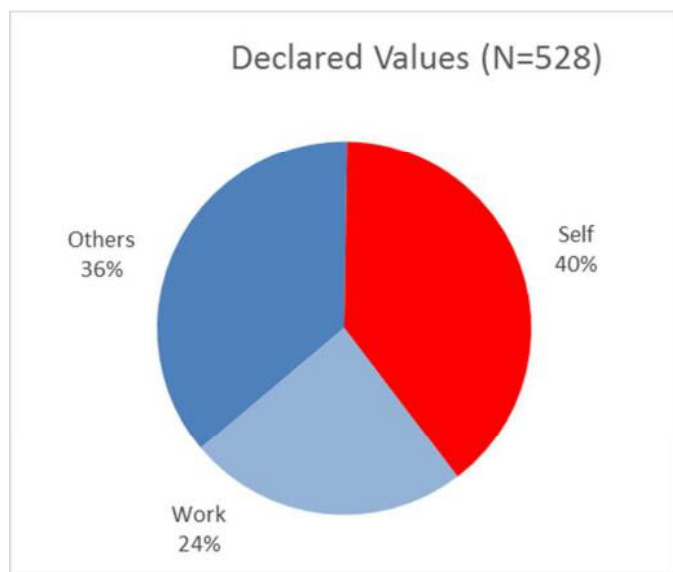


Figure 6. Breakdown of declared values by type

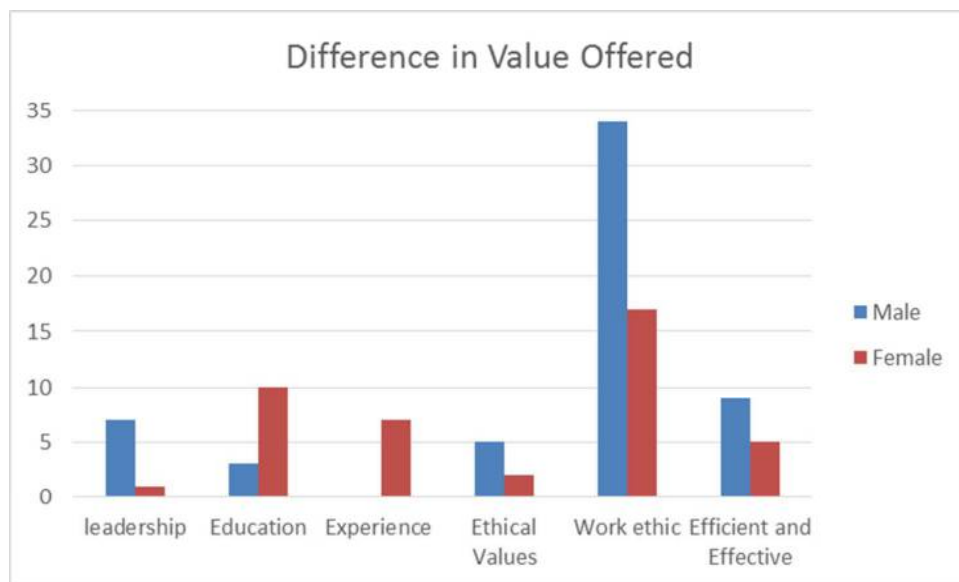


Figure 11. Gender differences in competencies (“value offered to employers”)