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Accounting learning preferences: the role of visualisation¹

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Abstract:

The accounting education environment is changing rapidly due to the increasing attention paid by public and private University and Institutions to the efficacy of course delivery and design. The learning preferences and attitudes of students represent an important starting point to develop an efficient and effective educational programme. Learning theories suggest that learning styles and preferences influence the effectiveness with which individuals learn. The success of educational programmes depends to some degree on students' acceptance and ability to adapt their learning to the new technologies (Richardson et al , 2013). Learning preferences may include also the visualization as educational tools. In recent years the relevance of visualisation has increased, since it may support a clearer and more efficient representations of accounting information (Libby, 1981; Smith and Taffler. The visualization could stimulate and enhance the engagement of the student in the process of learning (Yalamova, 2010). But little is known about the pedagogical benefits of the use of visualization as defined by accounting literature.

The paper tried to highly the gap between learning theory and the concept of visualization in accounting of both accounting students and academics. We present an Italian perspective on the role of visualisation, as learning preference, in accounting education, both in undergraduate and postgraduate courses. We used survey method, submitting Fleming's questionnaire (Fleming & Baume, 2006) to determine the relevance of visualisation in learning accounting subject.

Keywords: Accounting, Visualisation, Learning preferences, Vark; Italy

JEL Classification: A20, M40, M41

¹ The paper is the result of a joint effort of the authors. However, the sections can be attributed as follows: §1 and §5 to Enrico Bracci; §2 and §3 to Monia Castellini; and §4 to Mouhcine Tallaki. The research presents the Italian-based results of an international project "Visualisation in accounting education, an international perspective", coordinated by Maran, L., Vesty, G. and Inglis, R. (RMIT University). In this research we use Vark Questionnaire Copyright Version 7.1 (2011). This questionnaire is held by Neil D. Fleming, Christchurch, New Zealand. Translated into Italian in 2008 by Giovanni D'Orsi, Hotel Manager, Hospitality teacher NQF

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1. Introduction

In economic disciplines the educational content is still typically transmitted through chalk and talk classroom presentations (Becker & Watts, 2001). The teaching and learning environments in this area adhere to a fairly uniform format and each of the modules follow a content driven lecture and tutorial approach, complemented by the use of textbooks and tutorial question sheets (Reimann, 2004). This traditional approach, as pointed by Davis (2011), doesn't develop the necessary interpersonal, analytical and creative skills to deal with the new knowledge economy. In accounting education, as economic discipline, there are various calls demanding change of the content covered, teaching methods used, pedagogies employed, to develop professional competencies and skills (Kimmel, 1995; Porter and Carr, 1999; Demski and Zimmerman, 2000; Albrecht and Sack, 2000). Many calls are made also for developing new teaching models and tools coherent with new ways to use accounting knowledge and information in organisations (Bear, 2005; Goldman et al. 2002; Imel, 1998).

So, to create professionals and managers for the future we need to change the learning environment (Davis, 2011). In recent times the educators have sought to introduce innovative and competitive teaching tools in order to improve the quality of courses delivery and design. Kolb (1984) developed the “Experiential Learning Theory” that guide the learners to understand the adequate learning style. This theory offers different view of learning, it emphasises the role that the experience plays in the learning process. The learning is perceived not as outcomes but as holistic process grounded by the experience. The students in this process are considered as active part with a different typologies of learning preferences. Through the years various research have been conducted on learning preference. Students have shown diverse modes of learning with differing abilities (Morgan & Baker, 2013). Based on the “Experiential Theory”, Fleming (2011) developed the VARK Learning Model Test that defined four learning preferences (visual, auditory, read/write and kinaesthetic). The VARK model deals in perceptual modes, or senses that determine how students receive, interpret and disseminate information (Fleming, 2006).

The visual is considered one of the other preferences of learning's preferences. According to the VARK the visual includes the depiction of information in maps, spider diagrams, charts, graphs, flow charts, labelled diagrams, and all the symbolic arrows, circles, hierarchies and other devices, that people use to represent what could have been presented in words. This mode could have been called Graphic (G) as that better explains what it covers. It excludes anything that is text or pictorial as in a book, PowerPoint, movie or video, especially images that are real. It does include designs, whitespace, patterns, shapes and the different formats that are used to highlight and convey

information (Fleming, 2011). In the accounting literature, unlike the learning theory, the notion of visual is more broader. The concept of visualization in accounting were stressed by some authors (Warren, 2005; Beattie and Jones, 2002; Hopwood, 1990; Parker, 2009). In this paper we seek to understand the importance of visualization in accounting and the learning preferences of both accounting students and academics. Little is known about the pedagogical benefits of the use of visualization as defined by accounting literature. Learning theories suggest that learning styles and preferences influence the effectiveness with which individuals learn. The success of educational programmes involving depends to some degree on students' acceptance and ability to adapt their learning to the new technologies (Richardson et al , 2013). In the other hand the accounting literature stressed about the importance of visualization in accounting. The paper, based on previous and concurring studies (Maran et al., 2013), tried to give an insight on the role of visualisation as a learning/teaching mode in accounting and this relates to the visual use of accounting in practice. The paper will be structured as follows. The first paragraph discusses the literature about learning preferences of students and the visualization in the accounting. The second presents the methodology. The third paragraph analyses the results that will be discussed in the final paragraph.

2. Literature review

Accounting education is changing rapidly. The importance of change in accounting education is due to several reasons. Adler and Milne (1997), for example, stressed about the importance of change and the students involvement. They argue that the basis for change in accounting education to more active student involvement is much broader than the need to supply the accounting professions with graduates who possess wider skills and competencies. Other authors have emphasized the importance of change in accounting education considering of new trends in management practices due to changes in organizational models. The change in organizational models imply the need for a multidisciplinary approach in the accounting practice context. Therefore, it is important that accounting educators take responsibility for the development of students' generic (soft) skills in conjunction with, discipline-specific skills (Boyce et al. , 2001). The link between accounting practices and accounting education became the aim of a wide academic debate (Kimmel, 1995; Porter and Carr, 1999; Demski and Zimmerman, 2000; Albrecht and Sack, 2000). Another aspect that leads to emphasize the change in accounting education is the willingness to adapt with the organizational needs. Coherently with evolution of ways to use accounting knowledge in organisations many authors underline how in accounting education is developing new teaching models and tools (Bear, 2005; Goldman et al. 2002; Imel, 1998). However, consistent with

the change in accounting education in the last years there have been many requests for a re-orientation of accounting education in order to include the increase of capability, skills and aptitudes such as communication, group working, and problem solving (Hassall et al. 2005). This is because “accounting educators need to anticipate the expected shift in accountants' skills and develop courses and teaching methods that are far more interdisciplinary and analytical in their orientation” (Howieson, 2003).

However, various economics departments start to use end-of-term student evaluations of teaching, but the relationship between instructors' assessments of their own teaching and their students' assessments is unknown (Bosshardt and Watts, 2001). In this regard Dilla et al. (2010) in their study “develop a taxonomy for examining the current state of interactive data visualization research related to accounting decision making”.

Following the above analysed studies it becomes apparent that it is necessary to improve teaching methods in accounting education. Improving teaching methods could allow students to learn more effectively and efficiently. In this sense is necessary that teaching methods have to be appropriate to the students' preference (Kumar et al. 2012) and student's learning style (Kolb, 1976; 1984; Fleming and Mills, 1992; Fleming, 2011).

A single-mode approach to course delivery assumes that students all learn in the same way, in reality, however, students display a range of approaches to learning and a single-mode approach to delivery means that instructors will only reach some of the students (Richardson et al , 2013). Instructors who are knowledgeable about learning styles and their implications are better able to modify or adapt their teaching strategies to ensure that the learning environment maximises the learning potential of each student (Zapalska and Brozik, 2006).

Therefore, it becomes important for the purpose of improving teaching methods to understand the learning style of students. The analysis of the learning style makes possible to understand the ways by which students learn and how the learning context interacts with learning choices (Boot et al., 1999). Besides, success in teaching involves not only expertise of content material but also an understanding of students' learning styles and study behaviours. Students vary on learning capacities, motivation, styles and approaches. An understanding of these characteristics can aid educators to augment teaching strategies to make course work more engaging, meaningful and enjoyable (Dunn and Dunn, 1978).

Learning style is therefore important to develop appropriate teaching methods, however it is important the define and understand it. Various definitions are present in the literature. Vorhaus

(2010) defined learning style or preference as how an individual learns, perceives, interacts with, and responds to the learning environments. Whereas, Felder and Brent (2005) considered learning preferences or styles as the manner by which the brain works most efficiently to process, comprehend, and learn new information. Other definitions have emphasized the relationship between learning style and individual preferences, Kocinski (1984) defined learning style as an individual's preferred way to learn. Learning preferences regard the ways that people prefer to interchange information, and it includes auditory (learning by hearing), visual (learning by seeing), and kinesthetic (learning by doing) (Felder and Brent, 2005; Fleming, 2001).

Several authors have used the theory of learning style to improve teaching methods. Some, for example, have proposed the use of multisensory material that understand and manage elements of difficult information processing (e.g. Dunn and Dunn, 1978; Sprenger, 2003; Kefe and Jenkins, 2000; Jenkins and Keefe, 2001). This could stimulate and enhance the engagement of the student in the process of learning (Yalamova, 2010). One method that helps in acquiring information about students' learning styles is the Learning Model Test called 'VARK'. It was developed by Neil Fleming (1992) and based on the "Experiential Theory" (Fleming and Mills; 1992; Fleming 2011). The VARK questionnaire is useful to measure students preferences of learning. A number of studies have been undertaken to confirm the reliability of VARK as a diagnostic tool (Hawk and Shah, 2007; Leite et al., 2010) and to determine the extent to which students have a particular learning preference (Fleming and Mills, 1992; Maran et al., 2013). The VARK model is useful for teachers who seek to develop additional learning strategies for their classroom (Morgan & Baker, 2013; Ramayah, Sivanandan, & Nasrijal, 2009). Knowledge of students learning styles and preferences can help instructors to select or emphasise appropriate methods of instruction that best support learning preferences (Richardson et al , 2013). The VARK is used, particularly, in medical education researches (Murphy et al., 2004; Felder & Brent, 2005; Alkhasawneh et al, 2008), while in accounting education research the VARK is not widespread .The VARK defines four preferences style of learning: Visual, Aural / Auditory, Read/Write and Kinesthetic. Some people may have more than a preference, in such a case they are defined as Multimodal. According to Fleming (2011) "Visual" includes the depiction of information in maps, spider diagrams, charts, graphs, flow charts, labelled diagrams, and all the symbolic arrows, circles, hierarchies and other devices, that people use to represent what could have been presented in words. Aural / Auditory describes a preference for information that is "heard or spoken." Learners who have this as their main preference report that they learn best from lectures, group discussion, radio, email, using mobile phones, speaking, web-chat and talking things through. Read/write represents preferences for information displayed as words. Kinesthetic refers to the perceptual preference related to the use of

experience and practice (simulated or real). In the modal category they are of two types. There are those who are flexible and who switch from mode to mode depending on what they are working with. They are context specific (Type One). There are others who are not satisfied until they have had input (or output) in all of their preferred modes. They take longer to gather information from each mode and, as a result, they often have a deeper and broader understanding (Type Two).

In recent years the relevance of visualization and its role in accounting education has increased (Maran et al., 2013). The visual tools may support the accounting information (Libby, 1981) in order to make clearer and more efficient representations (Smith and Taffler, 1996). This body of literature is focused on visualisation and accounting system design for business practice (Courtis, 2004; Davison, 2008; Campbell, et. al., 2009; Davison and Warren, 2009; Parker, 2009; Quattrone, 2009; Warren and Parker, 2009; Busco and Quattrone, 2015).

Recent trends in the accounting literature suggest the use of illustrative descriptive tools to promote accounting as a visual technique (Beattie and Jones, 2002; Davison 2008; Davison and Warren, 2009; Parker, 2009). For example Beattie & Jones (1997) included the use of graphs in annual reports. Graves, Flesher et al. (1996) considered the use of pictures in annual report as visual tools. The accounting is considered as the art of mapping activities and making visible the practices and organizational processes (Parker, 2009). Its organisational mode of thinking and knowledge arrangements is considered like visual agents affecting the way people behave and change (Quattrone, 2009, Busco and Quattrone, 2015). The importance of the visualization in accounting is linked to the fact that the use of some tools like graphs, charts, tables could help to emphasises the accounting visual technique (Davison 2008; Davison and Warren, 2009; Parker, 2009). The adoption of tools like diagrams, charts, graphs, as visual tools, can contribute to define, for example, the role of financial and non-financial data in accounting system design (Beattie and Jones, 2002, Busco and Quattrone, 2015).

Opposing to many an economists that sustain that accounting is all about numbers, matters relevant to accounting are communicated in three “languages”: numbers, words and visual images (Davison and Warren, 2009). The Authors support that the visual is a complete additional domain of communication that offers an abundant whole of signs that relate to accounting. In both financial and management accounting reports, the visual comprises pictures, photographs, cartoons, charts, maps and diagrams in addition to financial graphs. There is a minor but increasing academic literature that analyses the use of pictures within accounting, but the view so that the subject-matter is again fairly dissimilar (Davison, 2008).

Lee (1994) documents the increasing trend for companies to include visual and other presentational material in corporate reports, a trend which has subsequently accelerated. There is a strong corpus of research into the use and misuse of graphs in annual reports (Beattie and Jones, 2002), but photographic and other visual material has been relatively neglected. Moreover Vince and Warren (2012) emphasise the relevance and potential of photo-elicitation as a strand of visual research methodology establish the utility of employing visual methodologies in the examination of organizational life. Preston et al. (1996) draw on contemporary art criticism to explore the significance of selected visual images in US annual reports during the late 1980s and early 1990s.

From the literature analysis the visual techniques or devices is largely considered as tools that connect with contemporary, innovative education. But little is known about their pedagogical benefits. Especially that the learning styles of students could include other preferences as defined by VARK. We note that in accounting education there is a tendency to use more visualization tools (Busco and Quattrone, 2015). However, the VARK emphasized, in addition to visual, other learning preferences. Though the accounting literature that takes a broader notion of visual beyond the narrowly defined by VARK. This work seeks to contribute to both accounting education and general accounting literature focusing on accounting as a visual technique.

3. Methodology

To analyse learning styles that accounting education students prefer and to understand if the learning style if it is coherent with teaching methods (Calabretta et al., 2012) we use the VARK questionnaire. This questionnaire allows to analyse if accounting students and academics preferences are aligned with the holistic visual accounting techniques and are used in combination with the other three teaching approaches (auditory, reading/writing and kinesthetic).

The main objective, therefore, is to provide preliminary evidence on the extent to which visualisation techniques align with accounting students and academics preferences learning style. Thus, the aims of this paper are to identify student learning styles in relation to the visual sensory modality and examine the learning preferences of academic educators. The research questions of this study are as follows:

RQ1: What are the preferred learning styles of accounting students and academics?

RQ2: Is the trend in accounting to use the visual compatible with the learning preferences?

In answering to the research questions, we aim to fill the gaps in accounting education knowledge on visualisation techniques and alignment with students preferred learning styles. We contend that the quality of teaching and learning would be enhanced by closely (re)-aligning visual techniques with learning style preferences.

The learning preferences of students in the undergraduate and postgraduate degree were analysed separately, in order to understand if there are differences in the learning preferences of the two. It was decided to adopt a quantitative methods, specifically the empirical study bases on surveys of academics and accounting students (undergraduate and postgraduate). The questionnaire adopted was already tested in previous study (Maran et al., 2013).

The research is conducted in the Department of Economics and Management of the University of Ferrara, Italy. The participation at the research project was voluntary. The questionnaire was distributed both for undergraduate, postgraduate students and accounting academics of the Department. The involvement of academics allows us to understand the correspondence between student preferences and those of academics, this enables to have an overall view and to interpret results in order to adapt the didactical method with the learning preferences.

4. Preliminary Results

The questionnaire was administered from December 2013 to March 2014, especially to the degree courses in accounting. The VARK questionnaire has sixteen multiple questions, each question has four different responses. The VARK questionnaire responses are composed of four sub scales (a, b, c, d) that correspond to four different learning styles (Visual, Aural, Read/Write, Kinaesthetic). The result of the VARK score for each student is sum of the responses for four categories, which indicates a tendency towards one or more learning styles. In the data analysis it was made a difference between undergraduate and postgraduate degree, the objective was to compare average learning preferences at the different stages and to understand if there are differences in the learning preferences between undergraduate and postgraduate students. The tables 1 and 2 summarize the details of the questionnaires administered both for the undergraduate and postgraduate students.

Table 1 Questionnaires administered for undergraduate students

	Answered questionnaire	Tot. number of students	Coverage rate
First year	266	515	52%
Second year	137	405	34%
Third year	207	275	75%
Total / Average	610	1195	51,05%

Table 2 Questionnaires administered for postgraduate students

	Answered questionnaire	Tot. number of students	Coverage rate
First year	35	179	20%
Second year	111	231	48%
Total / Average	146	410	35,61%

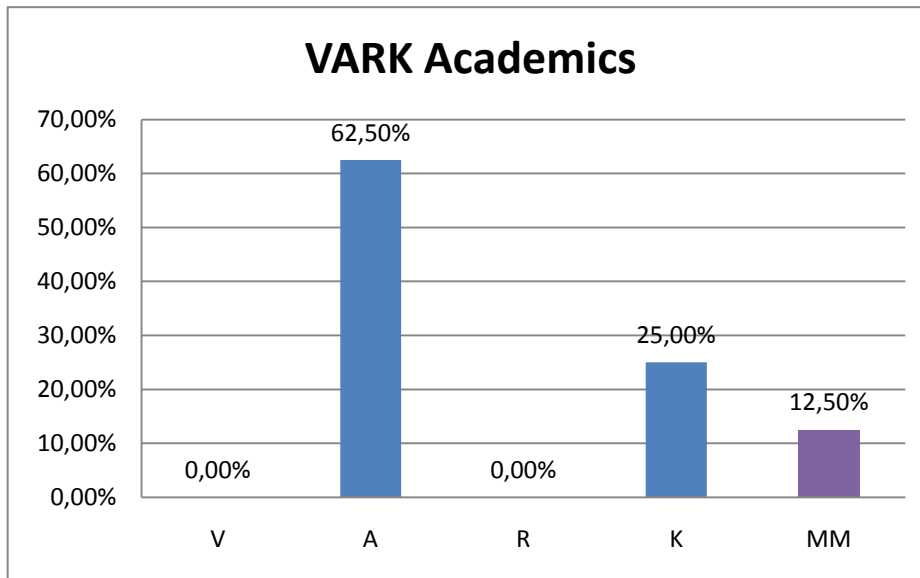
The questionnaires were distributed in paper form, the students were asked to complete the questionnaire and to deliver it directly to the researchers. It was distributed and collected 756 questionnaires (610 for undergraduate and 146 for postgraduate students), the coverage rate is 47,10% (51,05% for undergraduate and 35,61% for postgraduate students). Only 3 questionnaires were unusable, and were eliminated. The students have also contribute to identify the learning preferences (Visual, Aural, Read/Write, Kinaesthetic). In addition, we distributed and collected 8 questionnaires from accounting academics of the Department. In the department there are 13 academics accounting, we cover 61,54% of total accounting academics. The data was analysed using an Excel spreadsheet, for each student/academic we have entered all the scores of the various categories to determine the learning preferences. We calculated also the average learning preferences and the standard deviation.

➤ Academics

The academics who contributed to the research project are 8, all academics belong to the area of accounting. The dominant learning preference for the academics was Aural (Mean 7; SD 2,07), 62,5% of academics have shown a preference for Aural style of learning. The second dominant style was Kinaesthetic (Mean 6,25; SD 3,37), 25% have a preference for Kinaesthetic style. While

no academics displayed Visual (Mean 3,71; SD 1,67) and Read/Write (Mean 4,38; SD 2) as a single learning preference.

Figure 1: Single VARK and Multimodal preferences of academics



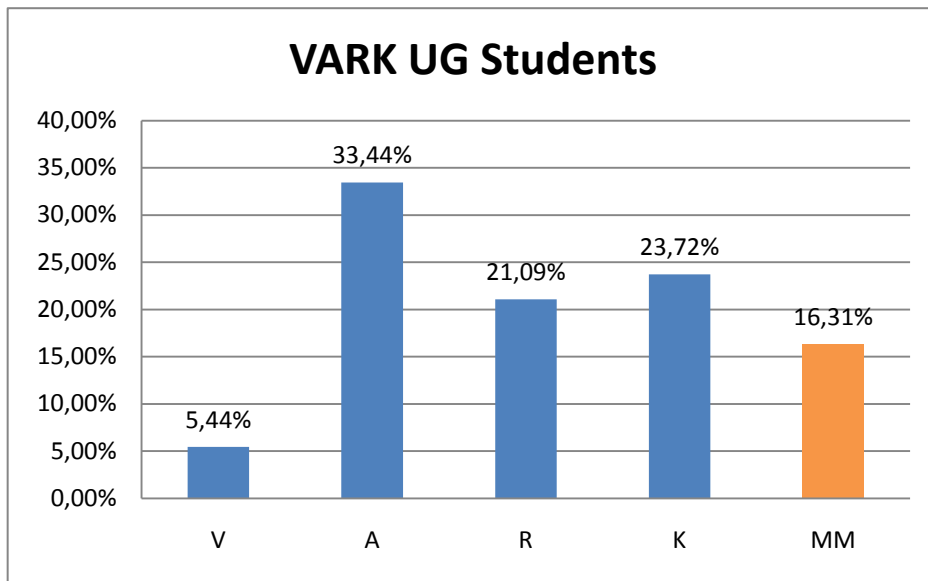
One academic (12,5%) had a multi-modal preferences (Aural / Kinaesthetic). The sum of the responses for the four categories is 16, according to Fleming (2011) this academic is classified as Type 1. Those that belong to this category are flexible and switch from mode to mode.

For academics the learning style preferred is Aural, this means that the academics have the tendency to prefer information that is "heard or spoken." Learners who have this as their main preference report that they learn best from lectures, group discussion, radio, email, using mobile phones, speaking, web-chat and talking things through (Fleming, 2011).

➤ **Undergraduate students**

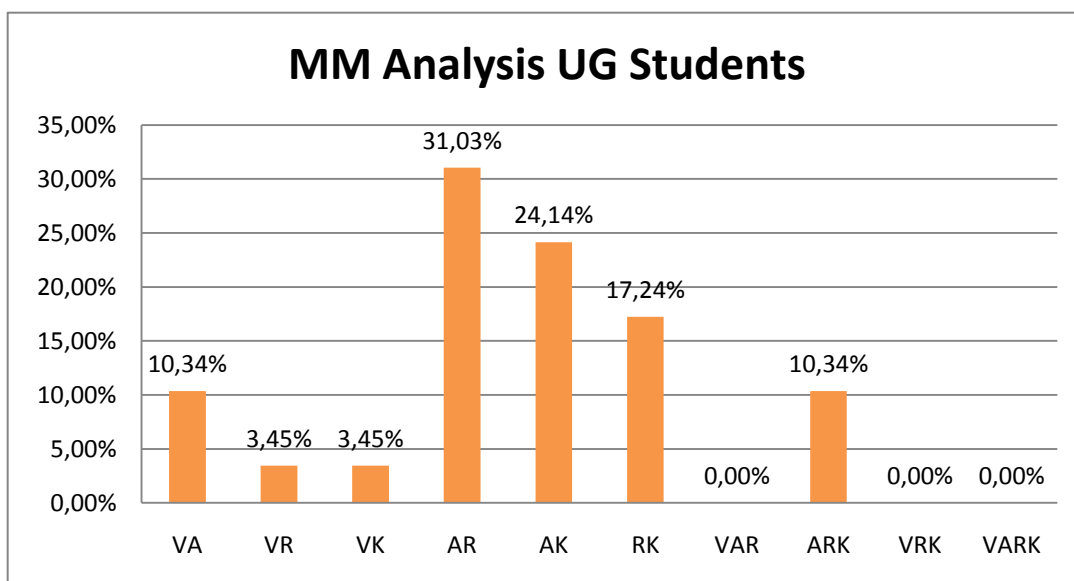
For the undergraduate students we distributed and collected 610 questionnaires. The dominant learning styles was "Aural". As we note from figure 2, the main part (33,44%) of undergraduate students had aural style as dominant preference. Which means that the students have preference for information that is heard or spoken (Fleming, 2011). Students who have this preference style learn best from lectures, group discussion, radio, email, using mobile phones, speaking, web-chat and talking things through (Fleming, 2011).

Figure 2: Single VARK and Multimodal preferences of undergraduate students



The undergraduate students have also expressed the preference for the “Kinaesthetic” style (23,72%), which means that the perceptual preference is related to the use of experience and practice, simulated or real (It includes demonstrations, simulations, case studies, practice and applications, Fleming, 2011). The third preference expressed by undergraduate students was the “Read/Write” style, the 21,09% prefer “Read/Write” learning style. While only 5,44% of undergraduate students prefer the “Visual” learning style. Which means that students tend to prefer reductionist than holistic style (Fleming, 2011).

Figure 3: Multimodal preferences of undergraduate students



The Multimodal population, figure 3, represents the 16,31% of the total sample. The majority was type 1 (85%). Those that belong to this category switch from mode to mode depending on what they are working with. The type 2 represents 4%, while 11% were in transition modality.

➤ **Post-graduate students**

For the postgraduate students we distributed and collected 146 questionnaires. As undergraduate and academics the dominant learning styles was “Aural” (figure 4). As we note from figure 4, 33,56% of the postgraduate students have Aural style as dominant preference. Which means that those students have preference for information that is heard or spoken and they learn best from lectures, group discussion, radio, email, using mobile phones, speaking, web-chat and talking things through (Fleming, 2011).

Figure 4: Single VARK and Multimodal preferences of postgraduate students

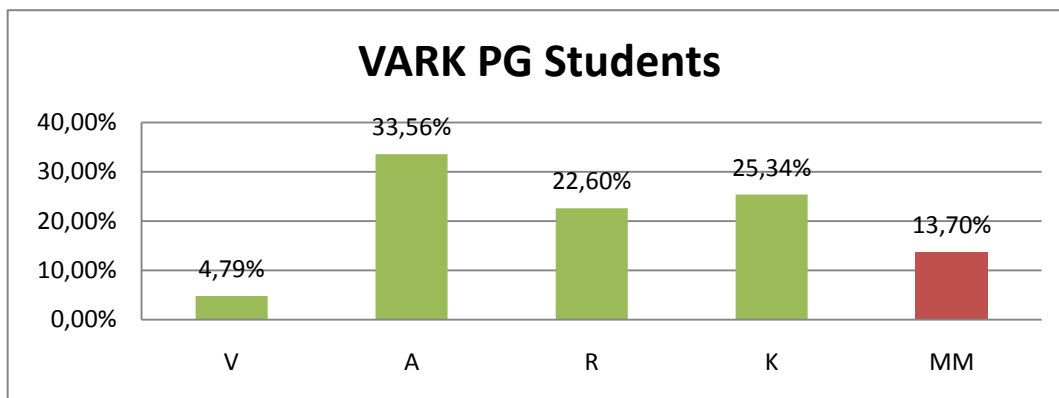
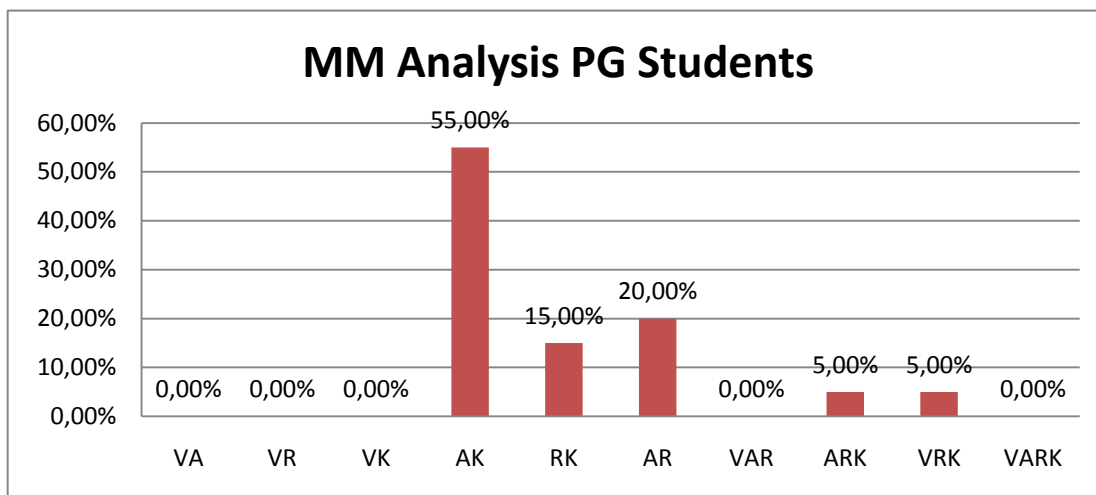


Figure 5: Multimodal preferences of postgraduate students



The second dominant style was “Kinaesthetic” (25,34%) which means that the perceptual preference of 25,34% of postgraduate students is related to the use of experience and practice (Fleming, 2011). The third preference style stressed by postgraduate students is the “Read/Write” style, 22,60% prefer “Read/Write” learning style. Similar to the other results, visual is the lower preferred learning style. Only 4,79% of postgraduate students prefer the “Visual” learning style. The results are similar to both undergraduate students and academics. The Multimodal population represents the 13,70% (figure 5), 55% was Aural/ Kinaesthetic. The majority was type 1 (70%).

These can change their learning style depending on the context. The type 2 represents 15%, while 15% were in transition modality.

5. Discussion and closing remarks

The results show similarity between dominant learning style of both academics, undergraduate and postgraduate students. This similarity is confirmed not only at the total level but also considering the results for each year. This means that learning style does not change in correspondence of a different level of study (undergraduate vs post). The majority of postgraduate students has attended the course of undergraduate, despite the time they have maintained the learning preferences.

The results are important for the purposes of the research, the similarity of the learning style among students and academics leads to question the trend of accounting to use more visual in teaching. This is in line with similar findings by Maran et al. (2013) in the Australian context. In accounting education the visualization assumes an important role. This because the visual tools could help to better presenting the accounting information (Libby, 1981) in order to make clearer and more efficient representations (Smith and Taffler, 1996). It could stimulate and enhance the engagement of the student in the process of learning (Yalamova, 2010). Despite the broader definition of the visualization in accounting which includes elements considered by the VARK in other learning preferences. Also the visualization in terms of VARK has an importance in the accounting education. Results shows that the visualization, in terms of VARK, is not the dominant style. Rather it is the last of the preferred learning style of students and academics. This highlights the question of the efficiency of teaching in accounting and whether the students learning process during the university courses may change when they enter an organisation and are challenged by real-life situations and problem solving. Single-mode approach to course delivery assumes that students all learn in the same way. However, students display a range of approaches to learning and

a single-mode approach to delivery means that instructors will only reach some of the students (Richardson et al , 2013). Therefore, academics and instructors who are knowledgeable about learning styles and their implications are better able to modify or adapt their teaching strategies to maximise the learning potential of students (Zapalska and Brozik, 2006) and prepare them to enter in probably different real-life working environment.

In this paper we tried to understand and to highly the accounting view of visualization and the preferences learning style. We analyzed the preferences learning style of both students and academics. We note that students and academics have different preferences compared to accounting tendency. Our observations regarding the importance of visualization in accounting education are based on an analysis of the literature. Further studies have to analyze what the academics do in the classroom and compare it with the preferences of the students. Adapt the teaching methods to the students' preference (Kumar et al.,2012) may increases the efficiency and effectiveness of teaching and allows to better engage students. Holeomb & Michaelsen (1996) reported that the decision to become an accountant is often made during the first two courses in basic accounting. So, it is imperative that these courses fairly and effectively depict the field. The efficiency and effectiveness also depend on the perceptions of students. At the same time, our evidence suggest that the learning styles may change when students move from an academic environment to a working environment. Further studies are required to understand and untangle this issue.

The limits of the research could be two. We did not consider an analysis by gender. Kumar et al. (2012) reported that males and females have different learning style preferences. Further research should consider an analysis by gender. Another aspect concerns the relationship between learning preferences and the cultural contexts. Donald & Jackling (2007) have shown the differences in learning style among Chinese and Australian students. Further research is required to compare the learning style of students belonging to various cultures. In our research this aspect could not be a limitation, since almost of students are Italian. Besides, it would be relevant to widen the research involving also the learning preferences of executives and practitioners, comparing to those of students and academics alike.

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