

# NEW APPROACHES TO STRUCTURE AND TECHNOLOGY OF KNITTING COURSES

## ÖRMECİLİK EĞİTİMLERİNİN YAPISINA VE TEKNOLOJİSİNE YÖNELİK YENİ YAKLAŞIMLAR

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### ABSTRACT

This paper describes modification of curricula of the courses covering technology of knitting. It has been noticed that students accept knowledge superficially, forget the learned knowledge quickly, and consider these courses as difficult ones. It has been decided to make an effort to move towards students and modify teaching/learning environment. To perceive their learning preferences the VARK test has been used. Based on results of the test, as well as introduction of practical projects, and unification of previously separated exercises, a curriculum has been modified. ASSIST test has been used to check that students have adopted a deeper approach to studying. It has been concluded that these modifications can give good results and that they will be used in the future.

**Key Words:** Technology of knitting, Education, VARK test, ASSIST test, Curriculum modification.

### ABSTRACT

Bu makale, örmecilik teknolojisini de kapsayan eğitimlerin müfredat programlarının modifikasyonunu tanımlamaktadır. Öğrencilerin bilgiyi yüzeysel olarak kabul ettikleri, öğrendikleri bilgileri çabuk unuttukları ve eğitimlerini zor olarak değerlendirdiklerine dikkat çekilmiştir. Öğrencilerin eğitimin ve öğretim ortamlarını modifiye etme yönünde çaba harcamaya karar verilmiştir. Öğrencilerin öğrenme tercihlerini belirlemek amacıyla VARK testi kullanılmıştır. Müfredat programları, bu testin sonuçlarına, dayandırılarak revize edilmiştir. ASSIST testi, öğrencilerin öğrenim görmeye karşı olan yaklaşımlarını benimsemelerini kontrol etmek amacı ile kullanılmıştır. Bu tür değişikliklerin iyi sonuçlar verebileceği ve gelecekte kullanılabileceği sonucuna varılmıştır.

**Anahtar Sözcükler:** Örme teknolojisi, Eğitim, VARK testi, ASSIST testi, Müfredat programı modifikasyonu.

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## 1. INTRODUCTION

There is an increasing interest in standards and quality of the educational process all over the world. According to the Lisbon Strategy (1), the Europe is trying to achieve the most dynamic and knowledge-based economy in the world, so the European higher education will have to demonstrate that it takes the quality of its programmes seriously. The teachers are the most important learning resource to most students, so it is important that they have a full knowledge of the subject they are teaching, necessary skills, experience and the ability to access the feedback from their students. Besides on teachers, students should also rely on a range of additional resources such as libraries, computer facilities, counsellors and advisers. For a

teacher it is important to organize the learning resources according to the student's needs and in the next phase to monitor the effectiveness, get the feedback and make improvements (2).

Lately calls for engineering curriculum renewal have been made all over the world due to the rapid technological advances, realization that engineering is practised in a global environment, need for development of communication and teamwork skills and need for life long learning. There are initiatives to change the learning environment in which engineering is taught and to rely less on traditional lecture formats and increasingly on the creative aspects of engineering using active learning and problem based learning to engage students more effectively. Many researchers

focus on engineering and industrial design education or related to that - a need for curriculum renewal. Their attempt to define the basic needs and worth knowledge for the education of engineers (3,4). They also try to define the problems with the approach to students and the possible options to engage the students (5,6,7).

The apparent reduction in appeal in engineering education of textile technologists and textile designers, and at the same time rise of interest in non-engineering design courses at the Faculty of Textile Technology, University of Zagreb have been drivers for modification of teaching method of a few chosen courses of knitting technology. It has also been observed that students consider knitting courses as

difficult ones and forget structures and technology of knitting quickly after their exams. That may indicate that they are adopting a surface approach to studying (8).

Biggs notes that a deep approach to study can be achieved when clear curriculum objectives are linked to suitable teaching and assessment method (9). Many researches have focused on describing variation in the ways that students and teachers experience learning and teaching and developing of teaching/learning environment (10,11). Teachers may not always present information in the way that best suits their students because, among the other reasons, they are not aware of different learning styles. Students could also achieve better results if they became conscious of their learning styles and make best use of them.

There is a variety of tests based on different theories, for instance Multiple Intelligence based on Gardner's work (providing the tools to explore how multiple intelligences vary from person to person) (12), Paragon Learning Style Inventory based upon Jungian learning & cognitive style traits (survey that provides a reliable indication of learning style and cognitive preference) (13), Honey and Mumford Learning Styles Questionnaire (to identify preferred ways of learning) (14). To determine a profile of our students learning preferences Fleming's VARK questionnaire has been used (15). According to the results, teaching/learning environment is modified by introducing active learning and teamwork activities. To check up if these changes in teaching of knitting technology give some results in deeper approach to study, a well known ASSIST test has been used (16). The effect of curriculum renewal, followed by concluding remarks is given. The purpose of this research is to define problems in order to make the changes of the approach to students. The changes should improve the teaching/learning environment and activate interest in students who are basically uninterested in their study.

## 2. METHOD

Based on method of determination of student's learning preferences – VARK test, we did changed methods of teaching.

### 2.1. Methods of teaching

The method of teaching at the Faculty of Textile Technology is generally imagined on the way that courses, including knitwear technology courses, are divided into lectures and exercises. Attendance to lectures and exercises are obligatory, with some allowed absence. Lectures are formal, chalk and board are used, machines and production processes are sketched. Transparency films or prospects are used for illustration.

Exercises are divided in parts where structures of knitwear are skilled, parts where calculations are carried out, and part where practical work on machines are carried out. Different swatches have been made, but never a complete article. It has been noticed during work with students that students don't interconnect this knowledge altogether, they learn superficially, with an aim of giving exam. They would forget the learned knowledge quickly, and that would become obvious during next year courses or during their work on final thesis.

### 2.2. Medium of the research

According to the above described strategies, we have decided to do the improvements of the educational process in the courses of knitting for all the students that participated knitting courses in one semester. That included the students from the 2<sup>nd</sup> year programme of Mechanical Technology in Textile, the 4<sup>th</sup> year programme of Mechanical Technology in Textile and 4<sup>th</sup> year programme of Projecting and Design of Textile and Apparel. All the programmes are used at the Faculty of Textile Technology, University of Zagreb. The above mentioned three groups of students are specialised and therefore small (15 students).

### 2.3. Method of determination of student's learning preferences

First of all, we have determined a profile of the student's learning preferences and used it as a guideline for the learning methods and resources setting up. The student's learning preferences have been determined using the VARK questionnaire. The questionnaire gives the answer to the question "How do I learn best?" and determines a profile of the student's learning preferences related to the ways they take in and give-out information. According to the re-

sults, the respondents are categorised into four main types of learners:

- a) Visual (V),
- b) Aural (A),
- c) Read/write (R) and
- d) Kinesthetic (K).

Visual learners respond best to the use of videos, pictures, posters, flow charts and graphs. The lecturer should use gestures and picturesque language to improve the intake of the information. After the lecture, visual learners use to reconstruct the obtained information in different ways and re-draw the shown material from the memory.

Learners with a strong preference for learning by Aural methods should attend the classes and seminars and discuss the topic with teachers and other students. The best way of learning for a learner with such preference is to talk to another "aural" person or to record the notes onto tape and listen to it.

Students with strong Read/Write preferences should use lists, dictionaries, glossaries, handouts and textbooks to take in the information. Then, they should read the notes a few times, rewrite the ideas in other words and re-organize the graphic material into statements.

Students with strong kinesthetic preferences should put plenty of examples into the summary, use the case studies, pictures and photographs that illustrate an idea, use the laboratory for learning and recall the experiments.

We have tested all the three groups of students. The VARK questionnaire consists of 13 questions, each with four multiple-choice answers. The complete survey developed for young people by Debra Jones is given in the Annex. It was possible to choose more than one answer to each question and to leave the question without an answer. The test has been taken anonymously because we wanted them to answer honestly. The results were observed using the VARK scoring instructions. The scoring chart was used to find the VARK category that each of answers corresponds to. The results of VARK questionnaire are shown on Figure 1. The results for

each question are given in the Table 4 that is shown in Annex.

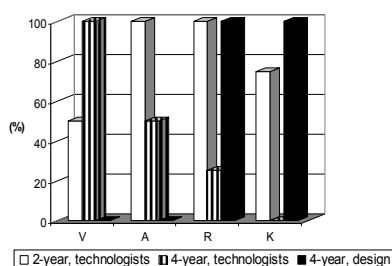


Figure 1. The results of VARK questionnaire

Differences in the VARK preferences of three student groups are well seen. The results shown on Figure 1 indicate that the students of the 2<sup>nd</sup> year programme of Mechanical Technology in Textile respond best to Aural and Read/Write teaching style, but they also respond very well to Kinesthetic and have moderate Visual style. The majority of students have multimodal preferences, so it is to expect from them to be more flexible and to get used to different teaching methods easily.

The students of the 4<sup>th</sup> year programme of Mechanical Technology in Textile have strong Visual preference and have no Kinesthetic preference. The most of them have a single preference (Visual) or bi-modal Visual and Aural preference.

The students of the 4<sup>th</sup> year programme of Projecting and Design of Textile and Apparel have bi-modal Read/Write and Kinesthetic preferences and none Visual or Aural preference.

The results show that each of the three groups of students respond differently, so it was necessary to adopt teaching methods to each group separately.

### 3. RESULTS

According to the VARK test results students of the 2<sup>nd</sup> year programme of technology are multimodal, what means they are adjustable to different learning methods. Their multimodal inclinations could be additionally exploited with active learning. Students of the 4<sup>th</sup> year programme of technology learn most easily visually and auditory, while contrary to that, designers of the 4<sup>th</sup> year programme learn most easily using kinetic way of learning and reading. Since they attend the course of Struc-

tures of knitwear and technology of knitting together with technologists of the fourth year, it was necessary to adjust to all of them, which means to use as much as possible different methods of teaching.

We decided to remain lectures unchanged, because they suit students of the 2<sup>nd</sup> and 4<sup>th</sup> year of technology which responds well to auditory learning as well as visual learning, using machine sketches and prospects. According to VARK test results classic lectures don't suit designers which would gain knowledge easier by reading suitable literature than listening to the lectures. Designers also reveal great tendency toward practical work.

During exercises, it has been responded to the students' need for multimodal programme, respecting visual, aural, read/write and kinaesthetic type of learning, by introducing (with classic auditory explanations) multi-media presentations, hard copies and intensified practice work.

Students have been faced with problems they have had to solve with help of materials they have got during the lectures and exercises and with help of assistant. They have been able to construct new knowledge actively. The introduction of practical projects with integration of previously divided parts itself had the biggest effect on exercises renewal. For instance, putting into connection theoretically learned structures of knitwear with getting the same on machine or calculating machine production with practical work on machines with project task of calculating production for their own imaginary factory. Previously a bit boring calculations became interesting when students began to think about their "own" resources and production efficiency. The new commercial CAD/CAM system for design and production of socks has been purchased and included into the exercises. The use of CAD system made numerous variations in design fast and easy done (17).

In a place of divided exercises from technology of sock production, students divided in two groups (designers and technologists) get a task to produce sock as they like. Designers made a sketch on paper and left to technologists to elaborate design in CAD/CAM and make sock using sock machine.

Although almost every student of technology believed that they transposed designers' illustration well, not a single student of design was happy with the result. As they were not satisfied, they have also learned to work with CAD/CAM and have made their own sock. They were much more satisfied with these socks (18). As technologists also wanted to design their own socks, all the students, during those few weeks, skilled whole process of socks production and at the same time experienced difficulties of communication between themselves. This is very important because difficulties in communication between designers and technologists are acknowledged problem in knitwear production. We consider important that with introduction of this method of working with students they have not only deeply accepted one branch of knitting technology, but have also learned something of the job of other orientation, so they are more prepared for future team work.

During the work with students, it has been noticed that all three groups accomplished exercises with more enthusiasm than in the previous years. They were satisfied that at the end of semester they have not only written theory and calculations, but also products they have made themselves.

Although all three groups have different results of VARK test, it seemed that this approach of combining different methods of teaching and setting practical tasks where they are able to interconnect learned by the teacher's opinion has given results.

### 4. DISCUSSION

In order to measure exactly the quality of students' approach to the study of knitting technology they have been tested using the ASSIST test.

The Approach to Study Skills Inventory for Students – ASSIST is a useful measurement tool for students' approaches to studying. ASSIST has been developed from Marton & Saljo's ideas of approaches to learning (8) combined with Entwistle & Ramsden's understanding of students learning (19).

The responses are classified into three approaches:

- a) deep,

**Table 2.** Answers to the questions

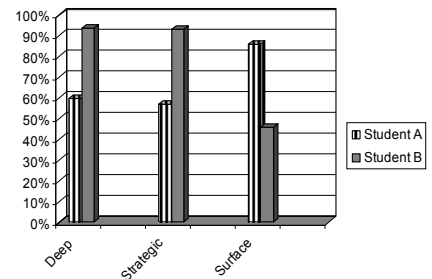
Questions that consider Lack of purpose	Marks		
	(1-disagree, 5-agree)		
	Student A	Student B	Average for all students
"When I look back, I sometimes wonder why I ever decided to come here"	5	2	2,8
"I am not really interested in this course, but I have to take it for other reasons"	5	1	2,2
"There's not much here that I find interesting or relevant"	4	1	2,5
"Often I find myself wondering whether the work I am doing here is really worthwhile"	5	1	2,0

**Table 3.** Teachers remarks

Teachers remarks	Marks		
	(1-low,5-high)		
	Student A	Student B	For all students
interest for course	1	5	4
assignment accomplishment	2	5	4
collaboration with students	3	4	4
course attendance	50%	100%	76%

prepared the courses are. To illustrate the connection, the results that two students of the 2<sup>nd</sup> year programme have given are shown in the figure 2 and Table 2. The students are named as Student A and Student B.

In addition, to compare the obtained results with the teacher's opinion, the remarks regarding interest for course, assignment accomplishment, collaboration with students and course attendance have been given in Table 3.



**Figure 2.** The profile of Student A and Student B

As seen from the Table 3, the student A attended only 50% of the course and didn't show interest for the course, while the student A attended course 100% and has been very enthusiastic. The students in average attended course 76%.

**5. CONCLUSION**

The outcome of this experimental work followed by students testing, are the changes of our approach to students and improvement of teaching/learning environment. It is hoped that in the future it will be able to activate interest in students who are basically uninterested in their study, and help them to adopt a deep approach to study. So, with this work necessary Curriculum modifications can be adopted to the knitting technology courses and hence students can become good engineers who will be prepared for their future job in the best way.

In the future research, different methods may be used to evaluate the interest in students. It is planned to monitor the motivation of the investigated students in the following knitting courses in order to note the differences in their approach.

b) strategic and

c) surface.

Each approach consists of sub-scales that are as follows:

1. Deep approach

- Seeking meaning
- Relating ideas
- Use of evidence
- Interest in ideas

2. Surface approach

- Lack of purpose
- Unrelated memorising
- Syllabus boundness
- Fear of failure

3. Strategic approach

- Organised studying
- Time management
- Alertness to assessment demands
- Achieving
- Monitoring effectiveness.

All three groups of students were tested to determine their approach to the study of the courses in knitting that are improved according to student's learning preference. The results of ASSIST test are shown in the Table 1.

**Table 1.** The results of ASSIST

Group	Mean value (%)

	Deep	Strategic	Surface
2 <sup>nd</sup> year Technologists	77,6	76	69,2
4 <sup>th</sup> year Technologists	75	73	68
4 <sup>th</sup> year Design	78	74	69

The values for all three approaches are very similar. For all the groups the highest values are for the deep approach and the lowest for the surface approach. We expected that the values of deep and strategic approach would be much higher than surface approach, but we are quite satisfied with the results as they are. To investigate the causes for such results, the answers obtained from each single student have been closely and separately discussed. Discussion has indicated interesting facts. The total results of approach have been compared with the answers to questions that consider lack of purpose. It has been well seen that students with high surface and low deep approach give high marks to that group of questions, while the students with high deep and low surface approach give low marks. The high marks for the questions from above mentioned group indicate that students aren't satisfied enough with their selection of the study and further more, with the courses that they attend, no matter how organised and

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