THE SURVEY REPORT REGARDING THE REVIEW OF EDUCATIONAL DELIVERY OF DIFFERENT PRACTICES in THE DESIGN and MANUFACTURE of FOOT ORTHOTICS

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This report aims to present an overview of how practices in the design and manufacturing of foot orthoses (FO) delivered in schools of higher education across Europe, from a descriptive perspective. The data obtained are based on the information obtained through an online survey, which was filled out by twenty-two podiatry schools from eight different countries as listed below.

INSTITUTION NAME	COUNTRY
Universidad de Extremadura	SPAIN
UCAM	SPAIN
University of Malaga	SPAIN
University of Seville	SPAIN
University Miguel Hernandez	SPAIN
Universidad de Valencia	SPAIN
Universitat de Barcelona	SPAIN
UManresa (UVic-UCC)	SPAIN
University of Plymouth	UNITED KINGDOM
Cardiff Metropolitan University	UNITED KINGDOM
University of Salford	UNITED KINGDOM
Glasgow Caledonian University	UNITED KINGDOM
Heph Condorcet	BELGIUM
Artevelde University of Applied Sciences	BELGIUM
Haute Ecole Leonard de Vinci	BELGIUM
Helsinki Metropolia University of Applied Sciences	FINLAND
South-Eastern Finland University of Applied Sciences	FINLAND
Institute National de Podologie	FRANCE
IFPEK Association	FRANCE
Fontys School for Allied Health Professions	NETHERLANDS
Escola Superior de Saúde da Cruz Vermelha Portuguesa	PORTUGAL
University of Malta	MALTA

The survey (**Survey Reviewing the Educational Delivery of Different Practices in the Design and the Manufacture of Foot Orthosis**) comprised of six sections:

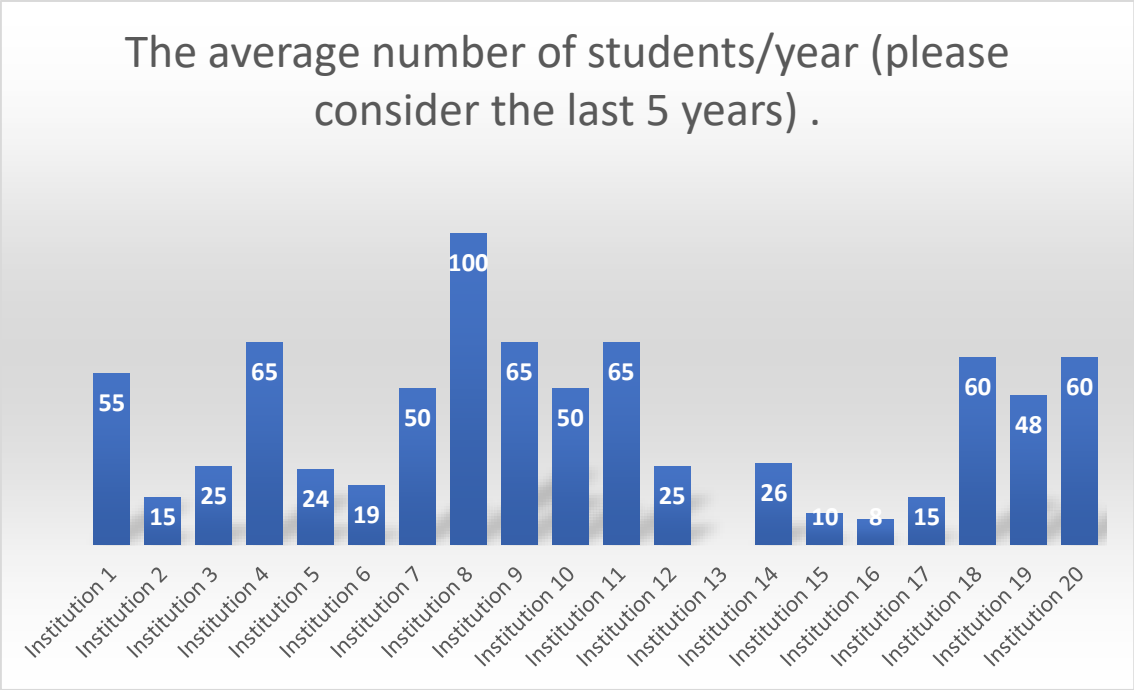
I. Introduction
II. Contact details (5 items)
III. General details related to education (6 items)
IV. Review of teaching I (2 items)
V. Review of teaching II (2 items)
VI. Details about the manufacturing process
    a. Input (3 items)
    b. Design (2 items)
    c. Manufacturing **(**1 item)

SECTION III. General details related to education (6 items)

ITEM I: Please indicate the average number of new diplomas/year (please consider the last 5 years) in your available degree programs. Please specify as Bachelor / Master / PhD. Use "NA" if that degree is not available.

Bachelor's

The average number of students that graduate annually from higher education schools across these 8 countries per year was 40 for the last 5 years.



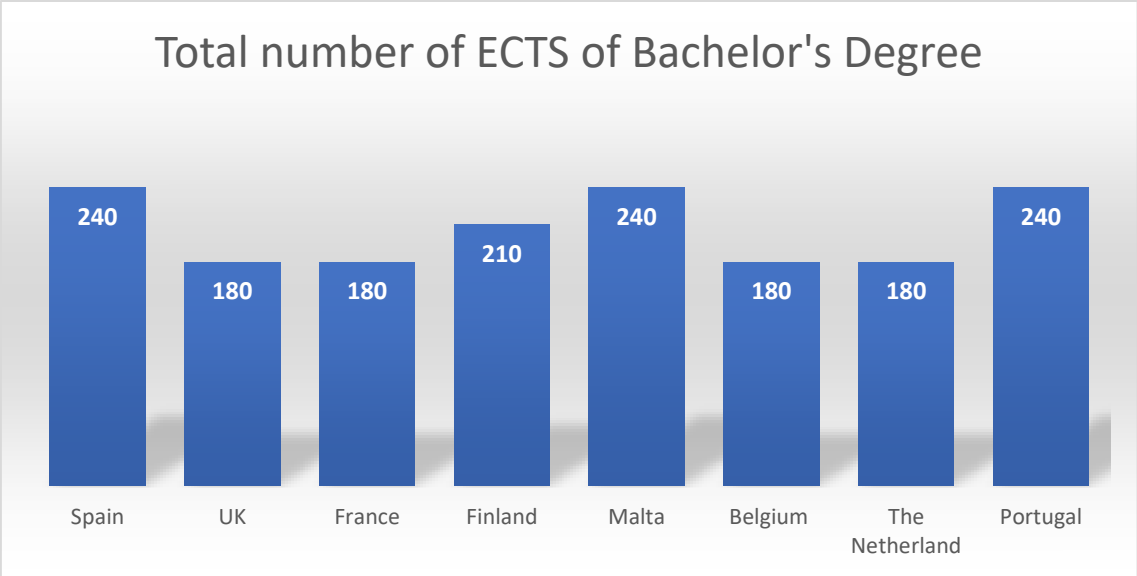
MSc and PhD

Only a few (5) of the higher education schools indicated that they have MSc and PhD students graduated in the last 5 years.

ITEM II: Please indicate the total number of ECTS of Bachelor's Degree/Master's Degree/Ph.D. curriculums for the last year. Use "NA" if that degree is not available.

Bachelor's

The results have shown that except for one curriculum, the number of ECTS/curriculum are 180 (Netherlands, Belgium, France, and the UK) or 240 (Spain, Malta, Portugal). The only exception is Finland declaring 210 ECTS credits available.



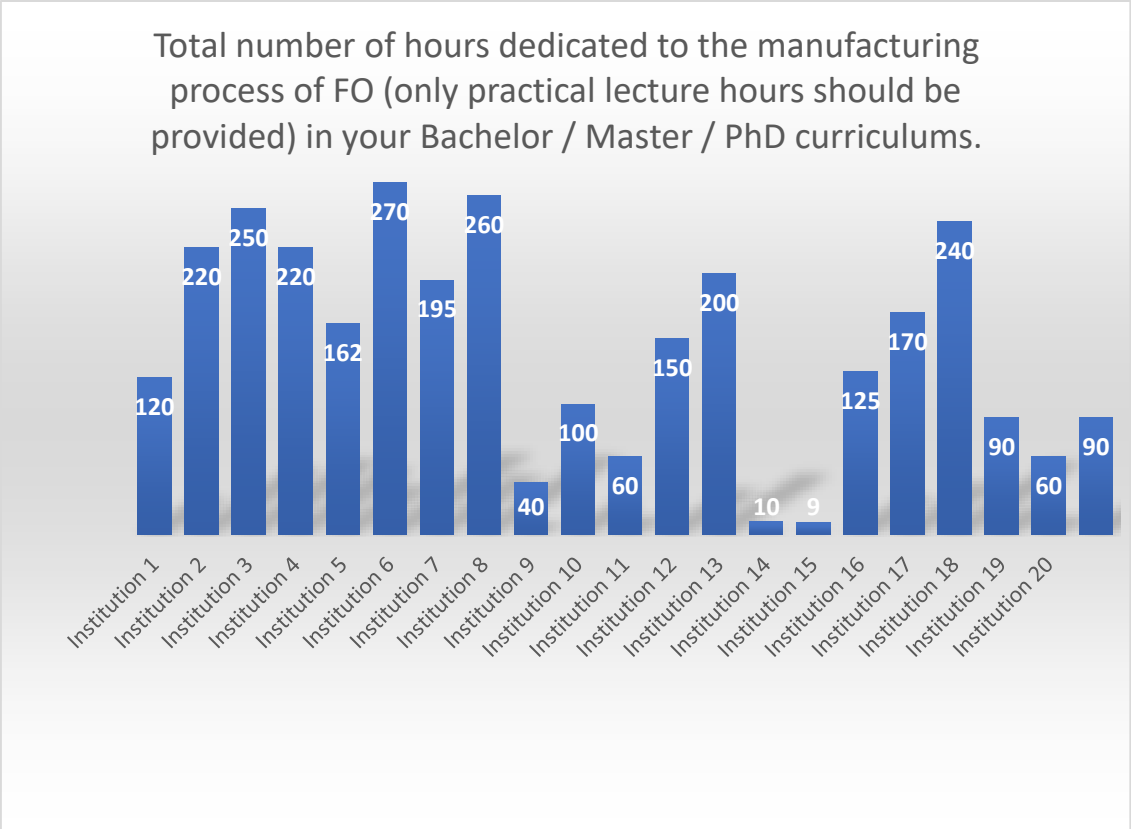
MSc and PhD

No higher education school has declared any ECTS credits for their available MSc and Ph.D. curriculums.

ITEM III: Please indicate the total number of hours dedicated to the manufacturing process of FO (only practical lecture hours should be provided) in your Bachelor / Master / Ph.D. curriculums. Please indicate as "NA" as necessary for a given curriculum.

Bachelor's

A wide variation existed between the curriculums concerning the total number of practical lecture hours dedicated to the manufacturing process of FOs. The lowest number of practical lectures was 9 hours and on the other end of the spectrum lies 270 practical hours. The average practical lecture hours across eight countries was approximately 145.



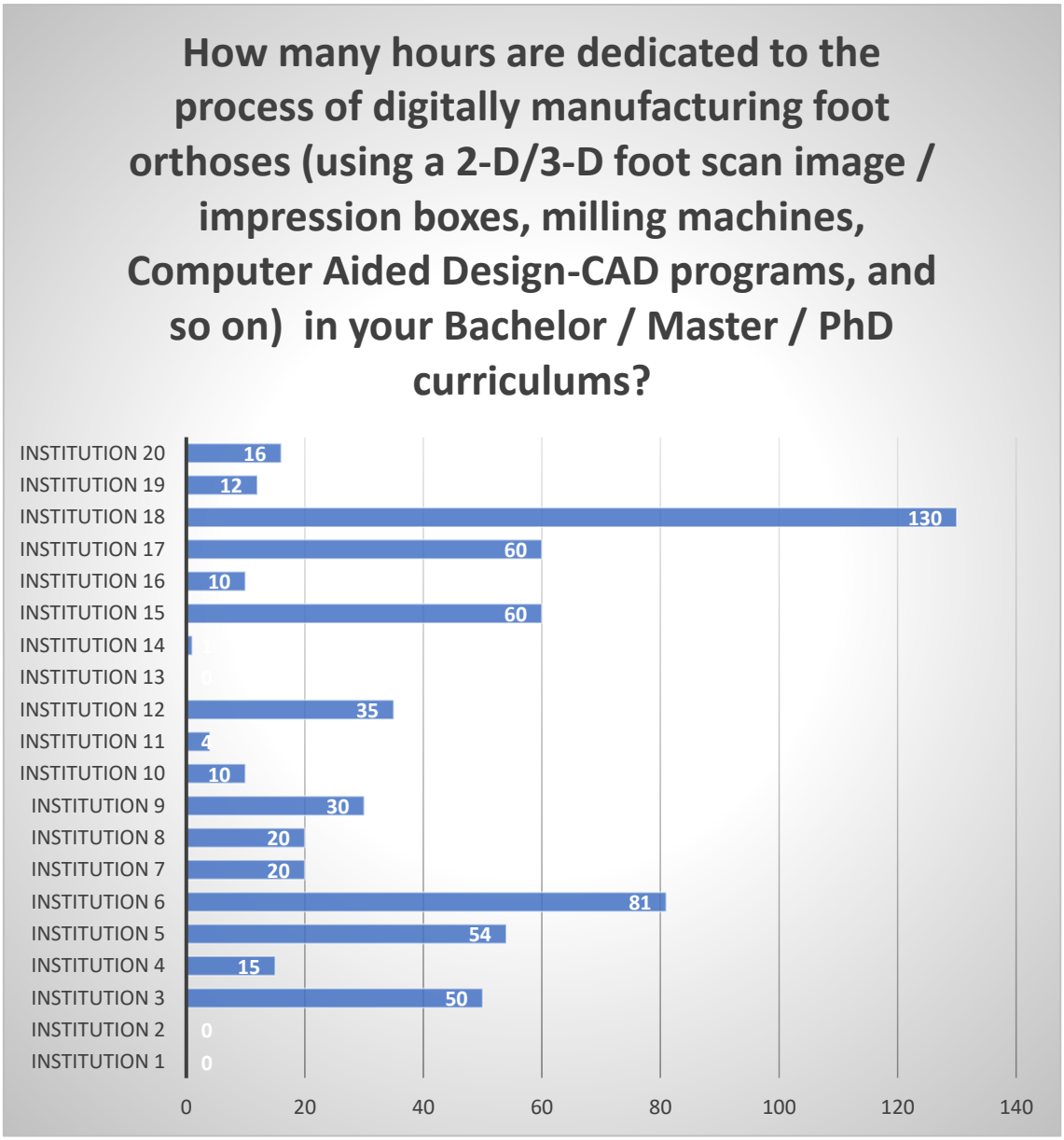
MSc and PhD

No higher education school has declared dedicated practical hours dedicated for the manufacturing process of FOs in their available MSc and Ph.D. curriculums.

ITEM IV: How many hours are dedicated to the process of digitally manufacturing foot orthoses (using a 2-D/3-D foot scan image / impression boxes, milling machines, Computer Aided Design-CAD programs, and so on) in your Bachelor / Master / PhD curriculums? If there is no digital training in neither of your curriculum(s) please indicate as "NA".

Bachelor's

Among the schools of higher education,the highest number of hours for digital training was 130 hours. Three of the schools declared no digital manufacturing training at all. The average number of hours dedicated to the process of digitally manufacturing foot orthoses was approximately 32.



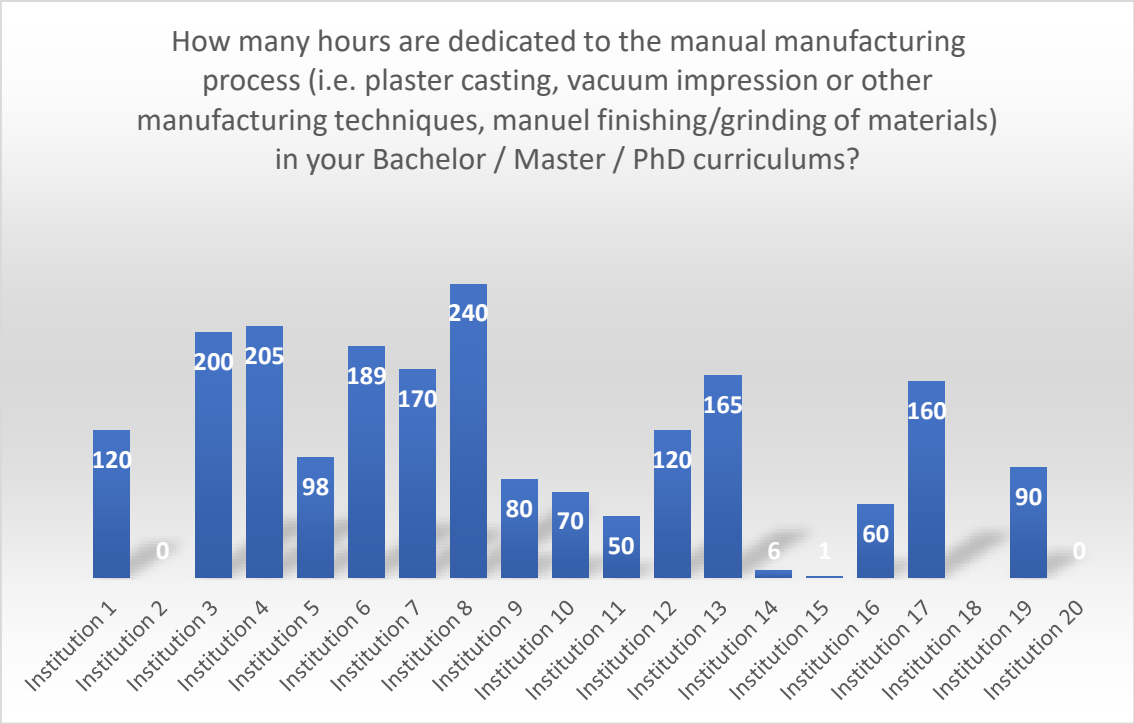
MSc and PhD

No higher education school has declared dedicated hours for the process of digitally manufacturing foot orthoses in their available MSc and Ph.D. curriculums

ITEM V: How many hours are dedicated to the manual manufacturing process (i.e. plaster casting, vacuum impression, or other manufacturing techniques, manual finishing/grinding of materials) in your Bachelor / Master / Ph.D. curriculums? If there is no traditional training in neither of your curriculum(s) please indicate as "NA".

Bachelor's

The number of hours dedicated to manual manufacturing process was between 1 and 240 hours. The average number of hours dedicated to the process of manual manufacturing process of foot orthoses was approximately 119.

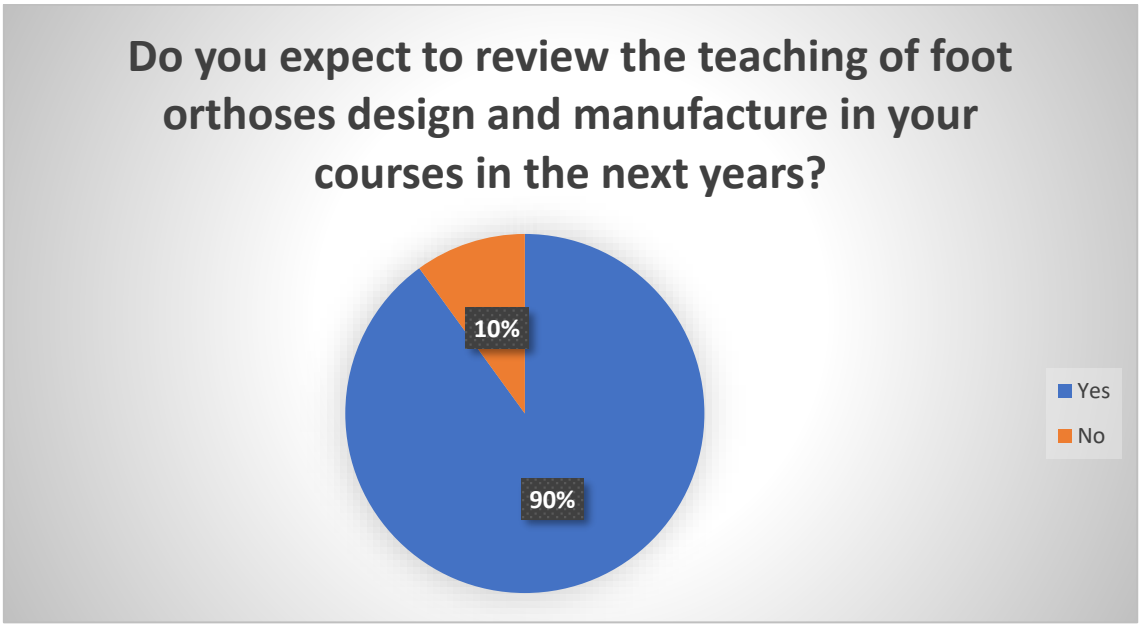


MSc and PhD

No higher education school has declared dedicated hours for the process of digitally manufacturing foot orthoses in their available MSc and Ph.D. curriculums

ITEM VI: Do you expect to review the teaching of foot orthoses design and manufacture in your courses in the next years?

Only 10% of the higher education schools (n=2) did not plan to review their current teaching plan in the upcoming years. The rest and the majority (90%) plan to revise their current curriculum related to the manufacturing of foot orthoses in the upcoming years.



SECTION IV: Review of teaching I (2 items)

If the answer to the question "Section III-Item VI: Do you expect to review the teaching of foot orthoses design and manufacture in your courses in the next years?" was "yes" the respondents were referred to Section IV: Review of teaching I

ITEM I: Please provide an indication of any content change.
When the respondents were asked to specify and explain their intention about the content change they foresee for future, most of the respondents expressed that they plan to incorporate more hours dedicated to digitization in the processes of design and manufacturing of foot orthotics. A few also stated that they would move towards distance learning, marketing, identification of dose-response signaling and linking motor control with orthotics.

ITEM II: Please provide an approximate timescale of the next review of FO teaching
The timescale of the next review of the curriculum related to FO teaching also varied between the schools of higher education within a range of every year to five years. Also, some of them stated that the review process was currently ongoing.

SECTION V: Review of teaching II (2 items)
If the answer to the question "Section III-Item VI: Do you expect to review the teaching of foot orthoses design and manufacture in your courses in the next years?" was "yes" the respondents were referred to Section V: Review of teaching II

ITEM I: If you have access to an open course on the digital manufacturing of FO , what would be the facilitators for you to get involved?
Many facilitators were indicated by the respondents. However, the main themes that are repeatedly expressed were (in the order of the most expressed);

1. The course is preferred to be online and easy to access
2. The course should be given by experienced people and increase theoretical knowledge but also provide practical training
3. The course should have flexible schedule and free to students
4. The course should include new technological equipments
5. The course should be compatible with ICT and applicable to Dutch regulations

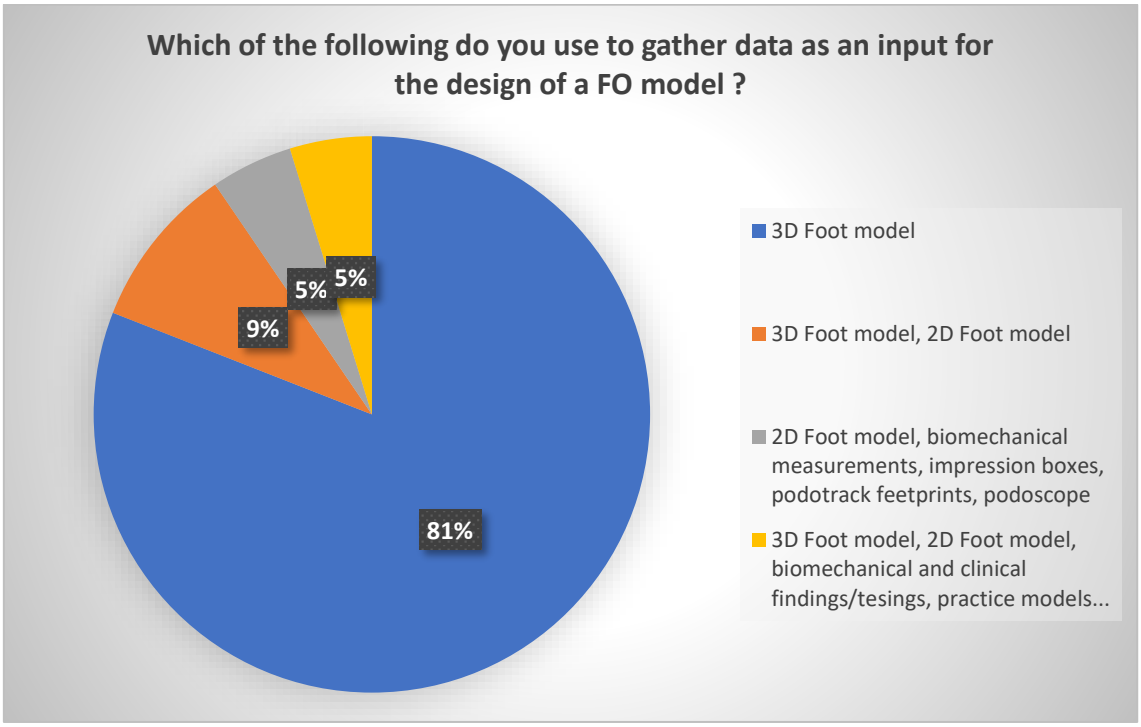
ITEM II: If you have access to an open course related to digital manufacturing of FO , what would be the barriers for you to get involved?

The barriers indicated were less then the facilitators. Even some of the respondents did not think that there would be any barriers at all. Even though the main barriers expressed by the respondents were (in the order of the most expressed):
1. Timing
2. Cost
3. Lack of material and equipment
4. Lack of clinical content and ICT problems

SECTION VI

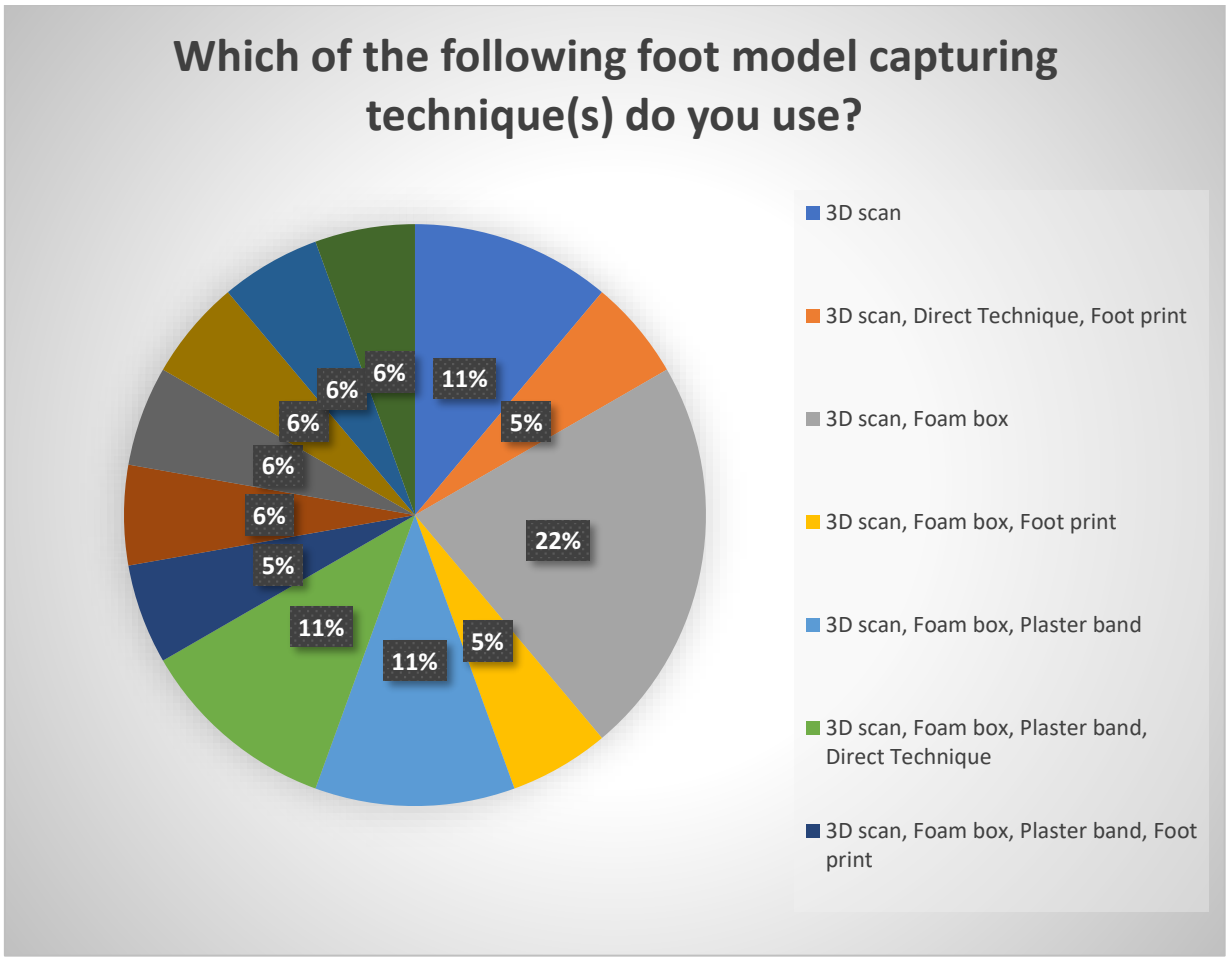
a. INPUT

ITEM I: Which of the following do you use to gather data as an input for the design of a FO model ?
81% of the respondents declared that they use 3D data as an input for the design of a FO model. The second most common type of data gathered by the respondents was obtained by using both 3D and 2D methods. The remaining 10% was divided between 2D foot model (accompanied with biomechanical measurements, impression boxes, podotrack footprints, podoscope) and both 3D-2D foot models(accompanied by 2D foot model, biomechanical and clinical findings/tests, practice model etc.).



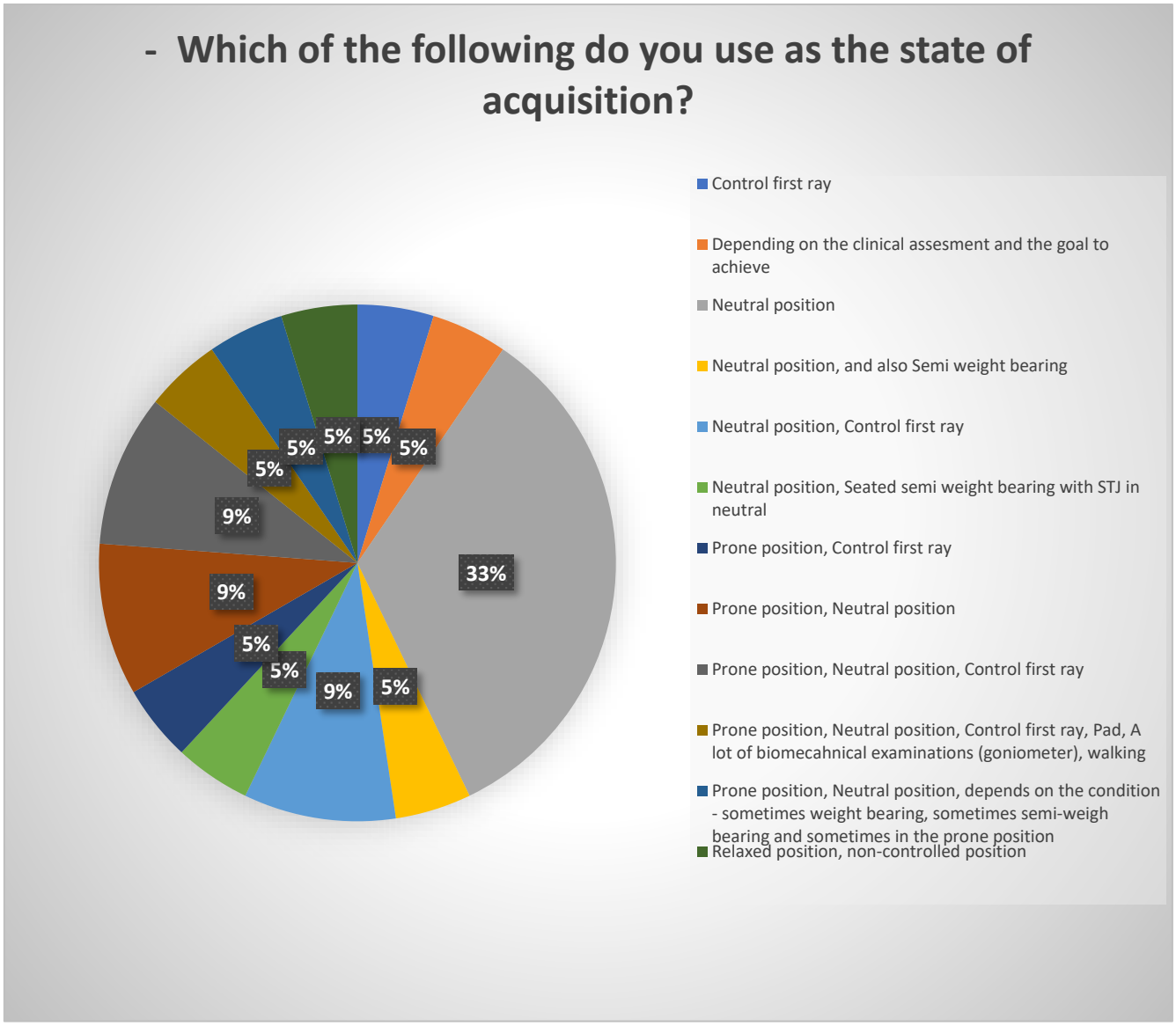
ITEM II: Which of the following foot model capturing technique(s) do you use?
The choice of acquisition technique to obtain data showed diversity among the respondents. The most preferred technique was the 3D scan-foam box couple (22%) followed by three equally preferred techniques only 3D scan (11%), 3Dscan-Foam box-

Plaster band, 3D scan-foam box-plaster band and direct technique. Other techniques were distributed between 5-6%.



ITEM III: Which of the following do you use as the state of acquisition?

According to the data obtained 33% of the respondents prefer to postion the foot in "neutral position" without weight bearing and any means positional control. Following neutral position "neutral position-first ray control", "prone-neutral position" and prone-neutral position-first ray control" came second each by 9% as the choice of state of acquisition. The rest were preferred equally (5%).

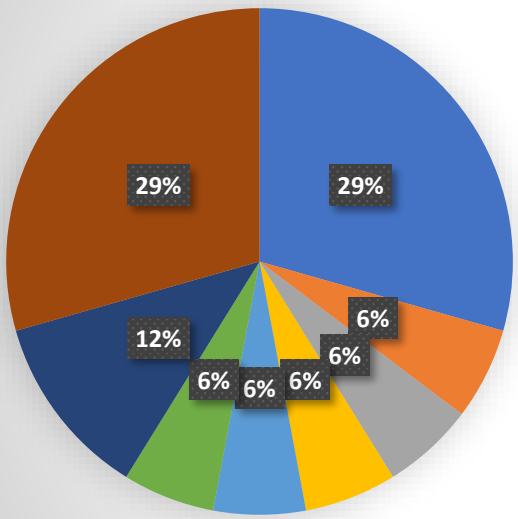


b. DESIGN

ITEM I: Material selection- Which type of material do you use ?

Ethyl Vinyl Acetate (EVA) and EVA/3D printing materials equally share (by 29%) more than half of the materials used in FOs. Although all respondents declared that they,at least partially, used EVA -resins, carbon, high and low temperature plastics- were also found among the materials used to manufacture FOs.

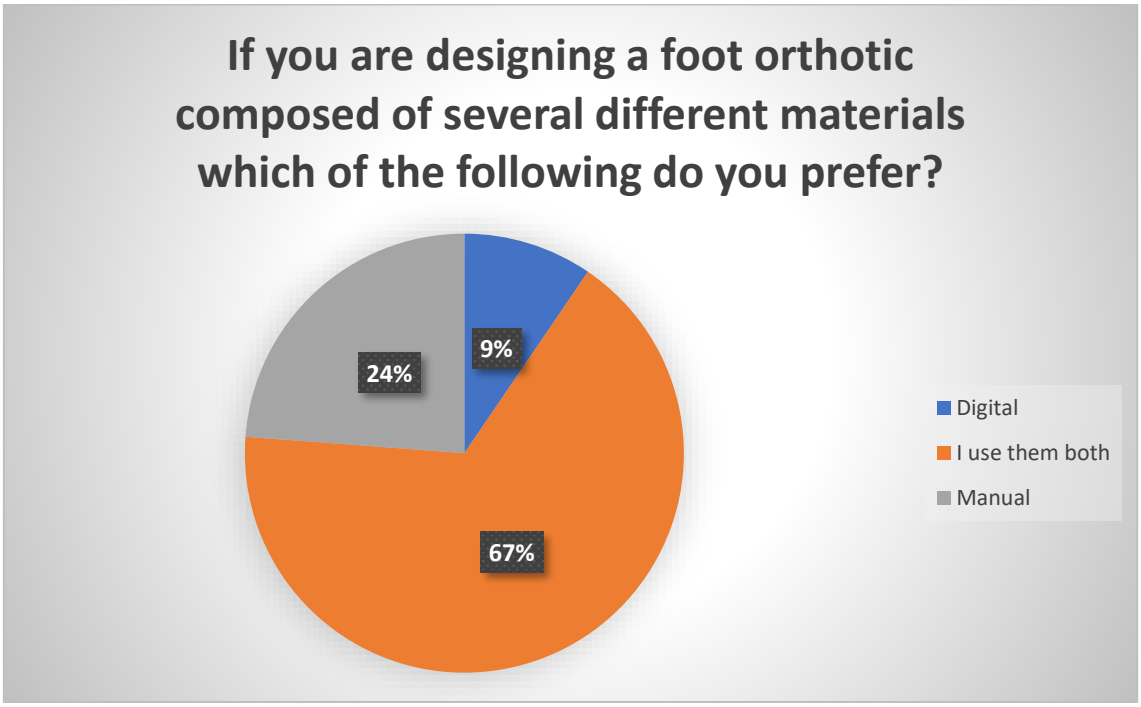
Material selection- Which type of material do you use ?



- Ehtyl Vinyl Acetate (EVA)
- Ehtyl Vinyl Acetate (EVA), 3d-printer materials
- Ehtyl Vinyl Acetate (EVA), Plastic high-temperature (Carbon fibre), Plastic low-temperature (Resins), Thermoplastic polyurethane (TPU)/ carbon fibre for 3d printed FOs
- Ehtyl Vinyl Acetate (EVA), Plastic low-temperature (Resins)
- Ehtyl Vinyl Acetate (EVA), Polypropylen
- Ehtyl Vinyl Acetate (EVA), Polypropylen, Plastic high-temperature (Carbon fibre), Plastic low-temperature (Resins)
- Ehtyl Vinyl Acetate (EVA), Polypropylen, Plastic high-temperature (Carbon fibre), Plastic low-temperature (Resins), Poron, plaztazote, Luna-materials
- Ehtyl Vinyl Acetate (EVA), Polypropylen, Plastic low-temperature (Resins)

ITEM II: If you are designing a foot orthotic composed of several different materials which of the following do you prefer?

It is clear that a considerable amount of respondents (67%) prefer to use manual and digital techniques in combination, whereas, only manual (24%) and only digital (9%) technique users were less.



c. MANUFACTURING

ITEM I: Which manufacturing technique(s) do you teach regularly?

The results showed that majority of the respondents (43%) prefer to teach “manual manufacturing” techniques and only 10% declared that they use only “subtractive manufacturing (CNC-milling machine)”. The rest used some kind of additive and/or subtractive technique in combination with manual techniques.