

Smart Education

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I. INTRODUCTION

Concerning their CO₂ footprint, Higher Education (HE) in the Netherlands must meet the more stringent requirements imposed by the government for energy efficiency and reducing CO₂ emissions. This survey, commissioned by SURFsara, examines the contribution of Information and Communication Technology (ICT) as enabler to reduce the CO₂-footprint of the Dutch higher educational institutes [1].

II. RESEARCH QUESTION

What contribution can Smart Education make to reduce CO₂ emissions by reducing mobility and use of energy without compromising the quality of Higher Education?

Smart Education: sustainable organization of education with ICT as enabler

III. METHODOLOGY

A survey with experts was conducted to determine the relevant aspects. The respondents of this survey [1] were 5 HE experts in the area of e-learning and 5 HE managers in the area of energy and sustainability. They were interviewed with the aid of a semi-structured questionnaire based on a foregoing study of literature. The findings were discussed in a workshop, attended by 6 people. This workshop was organized by SURF

IV. RESULTS

In recent years some universities and universities of applied sciences in the Netherlands used the Greenhouse Gas Protocol to perform measurements on the size of their CO₂-footprint. It has been revealed that about 50-80% of the CO₂-footprint is determined by the travel of students

and faculty to and from the educational institution. Not in the least by the rise in international students at Dutch institutes of Higher Education, causing a substantial impact on the environment due to air travel. Also the SusTEACH project in the United Kingdom proves that the mobility of students and faculty greatly contributes to the CO₂ footprint of a HE institute [2]. The deployment of ICT can make a substantial contribution to the objective to reduce the CO₂-footprint, mainly through virtualization and digitization of educational processes.

A. By educational design

The possibilities of digital interaction in recent years have exploded. The difference between face-to-face and online education is much smaller than it used to be. Therefore one of the solutions to reduce the mobility is, making part of the education location-independent by providing it online (so-called blended learning), taking into account the study phase and target students.

In the Netherlands the opinions of teachers and management of higher educational institutes about online learning are divided. The proponents of face-to-face education believe that the social processes are essential: the teacher acting as a role model and the students communicating with each other easily. Proponents of online learning emphasize the opportunities to focus on the individual student. It sets the student in charge of his own learning process and this promotes an active, responsible attitude, which fits the concept of Lifelong Learning. The advantage that it can lead to decreased mobility and thus to a reduction in CO₂ emissions is up till now recognized by few.

B. By organization of educational processes

The organization of education also can contribute to the reduction of the CO₂-footprint by the way they schedule

their classes, providing alternative educational locations, facilitating working from home by employees and reducing their surface area.

V. FUTURE RESEARCH

The results of this survey will be used in the PhD research, examining the impact of location-independence in blended learning for internal and external stakeholders of a University of Applied Sciences.

VI. DISCUSSION

- ICT makes it possible for Higher Education (HE) to provide high-quality online education, making face-to-face meetings less needed.
- The growing quality of technology enhanced education is disruptive for the mainstream Higher Education institutes.
- HE can reduce impact on the environment by
 - Striving for location-independency, designing blended learning
 - More emphasis on online learning in international exchange programs [3]
- A systemic approach is needed to understand the impact of location-independency in blended learning

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