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The Impact of Sustainable Education Practices on Food Consumption Behaviours – An Experimental Study of Agrarian School's Students in Hungary

Anikó Khademi-Vidra ^{a,*}, Izabella Mária Bakos ^a

^a Hungarian University of Agriculture and Life Sciences, Szent Istvan Campus, Hungary

Abstract

Hungary has a long agricultural tradition, but in recent years it has become more and more innovative, opening up to digital and sustainable trends. These trends include school-based independent farms and point-of-sale systems. While not all of the 61 vocational secondary schools in the new umbrella organisation (Agricultural Training Centres) set up by the Ministry of Agriculture are farms, our sample includes three institutions that are engaged in this type of activity. In our sampling procedure, the selection of the study population was determined by the proximity of the school to the area within our reach (max. 100 km, but in a different county) and by our personal knowledge of the head of the institution, whose willing and supportive cooperation formed the basis of our research. The 210 students in our non-representative sample were from a Jász-Nagykun-Szolnok county institution, 114 from a Bács-Kiskun county institution and 36 from a Csongrád county institution, making a total of 360 students. In the context of multifunctionality and sustainable education, there are many educational and pedagogical goals for such a self-driven phenomenon. Based on our empirical researches, we believe that the education system has an important role and responsibility in educating our young people to become conscious and environmentally friendly consumers, and in this spirit we have developed a proposal for an action plan (Student Enterprise Project) that could complement the agricultural practice activities in a way that is sustainable and self-development-oriented, and of course in a form that can be adapted to school.

Keywords: secondary school students, food consumption behaviour, agricultural vocational education, sustainable education, school farming, Hungary.

1. Introduction

According to various world organisations (UN, UNESCO, WHO), education is one of the most effective ways to develop the attitudes and skills of individuals to become sustainable consumers in an organised framework. The UN General Assembly launched the Decade of Education for

* Corresponding author

E-mail addresses: khademi-vidra.aniko@uni-mate.hu (A. Khademi-Vidra),
bakos.izabella.maria@uni-mate.hu (I. Mária Bakos)

Sustainable Development (DESD) in 2002. The aim was to integrate the concept and approach of sustainable development at all levels of education systems, contributing to the development of basic education, raising public awareness and the commitment of the labour market to sustainability (UNESCO, 2014; UN, 2002). At the same time, project-based sustainability has also become more and more prominent in public education in Hungary. Various alternatives and "eco-schools" have emerged in the pedagogy of sustainability in Hungary and Europe, with an important mission of sustainability education (Szeberényi, Varga-Nagy, 2017), as advocated and supported by UNESCO. In response to these new social, economic, environmental, socio-cultural demands, vocational education and training itself, and with it the institutional network of vocational education and training, has undergone a huge change in the recent past (Borbély-Pecze, 2016; Csákó, 2016). The ISCED classification of the Hungarian education system has remained basically unchanged: as a tradition of more than 50 years, upper-secondary education (ISCED 3) typically starts from grade 9 in Hungary, after completing the 8-grade single-structure educational phase (i.e. primary and lower secondary, ISCED 1 and 2). Most commonly, it involves 4 grades, less commonly 5, 3 or 2 grades. Based on the VET 4.0 strategy adopted by the government in 2019, the institutional structure of the initial vocational education and training changed from the school year of 2020/2021. Nowadays there are two types of schools in the new school-based vocational education system. Technicum based on economic feedbacks, instead of the upper secondary vocational school, the name „technicum” was introduced. This name is clearer, for many; it symbolizes quality vocational training even nowadays, this word may be more attractive to parents and students. As the name indicates, its graduates will be technicians. The uniform organization, the duality of training and the stronger connection to higher education justifies the change. The duration of the training in the technicum is 5 years. After the first two years of providing sectoral knowledge, dual training takes place in the second cycle. During the practical training period, the apprenticeship contract transforms into an employment contract, which provides the student the opportunity for income during the training. Students take their upper secondary school leaving examination from the four compulsory basic subjects, and the vocational examination of the technical vocational qualification will be their fifth subject. Thus, after a successful exam at the end of the grade 13, students receive two certificates of education; the upper secondary school leaving examination certificate and the certificate of the technical qualification. The knowledge, skills acquired in the technicums create an opportunity for graduates with good results to continue their studies in a similar sector in higher education taking into account the results of their vocational examination. The name of the other type of school is vocational school. The duration of the training in the vocational school is 3 years. After the first year of providing sectoral knowledge, dual training takes place in the next two years mainly within the framework of an employment contract. After graduation, the opportunity to obtain the upper secondary school leaving examination certificate or even the certificate of the technical qualification is open here as well. In addition to the two new types of institutions, several programmes were introduced in 2020 with the aim to support career choices, vocational training and access to upper secondary education (EC, 2021a).

Vocational education and training (VET) are expected to be designed for creating learning outcomes which meet the needs for skills and competences in the labour market (Markowitsch-Hefler, 2018). As a result, individual nation states are striving to meet new types of social, technological and labour market demands (Hoidn, Vít, 2021; Bolli et al., 2019). In Hungary, the Vocational Training 4.0 Strategy summarises the guidelines that put the world of dual, transparent and interoperable agricultural vocational training, which offers a career, into this modern vision. These expectations are also basic requirements, which are of course implemented in a way that takes into account the specificities of the agricultural economy (agriculture, horticulture, forestry, food industry). In the autumn of 2018, the Ministry of Agriculture still had 47 agricultural vocational training institutions and 65 places of work, where nearly 70 percent of the students were studying. In the context of the vocational training reform and strategy, and taking into account the specificities, from summer 2020 the Ministry-maintained institutions (which increased to 61 by 2020) were organised on a regional basis into 5 agricultural training centres (Central Hungary, Great Plain, Southern, Northern, Little Plain). As a result of a higher degree of integration than the industrial training centres, an average of 12-13 institutions was classified under the agricultural training centres that were created. The new Vocational Training Act maintains the institutions as separate legal entities, but the main management powers have been transferred to the heads of the

administrative centres of the five centres created. Legislators and administrators believe that this new institutional structure will be better able to meet the needs of the renewed vocational training. The first of the three main requirements for vocational training in agriculture is that theoretical and practical vocational trainers should have up-to-date knowledge and be able to keep up with technological developments in the sector (digitalisation, robotics, precision farming, etc.). At the same time, it is also important to create an attractive environment for students (training rooms, workshops/farms, sports and leisure facilities that offer an attractive alternative for young people who choose a career) and to offer an attractive career path (students should have a competitive qualification, skills and knowledge required by the economy, which will provide a secure existence and competitive income on completion of the technical school) (Csákó, 2016). In our opinion, the farming, autonomous agro-activist schools and educational institutions generating and participating in modern projects that respond to the needs of their environment are excellent pragmatic marketing elements of this triple expectation system, combining well the inviting future potential of agricultural education (Szekeres et al., 2020).

The focus of our study is, therefore, the activity of self-sustainable management and its impact on young people. Our aim was, on the one hand, to investigate the motivation to participate in school farming, whether it is a positive experience, what students like about it, whether they consume the food produced in school. We also wanted to know if and how their attitudes towards food, eating habits, food purchasing preferences and lifestyle characteristics are influenced by working in a school farm. Another important area of impact was the effect of farming on career socialisation: whether farming helps them to better understand and learn their profession.

Based on the reviewed literature, we assumed that introducing students to self-management in their schools can have a strong impact on both professional and individual socialisation processes. In our opinion, students who gain experience in such activities, either in farming or in food production, are involved in experiential learning processes rich in success experiences, which, presumably, can lead to a more conscious and positive attitude towards food consumption. On this basis, our questionnaire study aimed to test the following two hypotheses:

Hypothesis 1: Self-production activities at school (together with sales) have a positive impact on young people's personal development, individual and career socialisation: the acquisition of experience is a very important catalyst.

Hypothesis 2: Young farmers have more health-conscious eating habits, food purchasing preferences and different lifestyle traits than non-farmers.

1.1. International good examples of practice-oriented agricultural vocational schools

In our study, the school farming activity process plays an important role, because the projects and joint practices in schools provide an excellent opportunity for the personal and professional development of young people. For this reason, we were curious to find effective "good practices" in the international "educational market" of agricultural vocational training (Hoidn, Vít, 2021; Bolli et al., 2019; Locke, Maton, 2019; Niemi, Jahnukainen, 2019; Ümarik, Goodson, 2018; Markowitsch, Hefler, 2018). However, in order to look at these practical activities, it is necessary to be aware of the framework of interpretation: the definition of the European levels of vocational education and training (ISCED). After positioning them in the classification system, we will turn to the type of institutions in the education system of a given Member State (Bauer, Gessler, 2017; Locke, Maton, 2019; Bonoli, Wilson, 2019; Lassnigg, 2017) and then to the specific project activities of a given secondary school. Three countries are used as reference countries in our study: Denmark, Austria and Germany (Hoidn, Vít, 2021; Schlögl et al., 2020; Atzmüller, Knecht, 2017; Durazzi, Geyer, 2019; Di Maio et al., 2019; Lassnigg, 2017; Schmid, 2020). These countries have exemplary agricultural vocational training models, and we wanted to review their good practices because their examples are an excellent representation of agricultural practices and complex farming activities that are based on tradition, but at the same time up-to-date, sustainable and innovative knowledge content.

1.1.1. Denmark

The VET programmes are divided into three tracks: one for young people called *erhvervsuddannelse* (EUD), one for adults over the age of 25 called *erhvervsuddannelse for voksne* (EUV) and one called *erhvervsfaglig studentereksamen* (EUX) which is a vocational education combined with general upper secondary courses (Norden, 2022; EC, 2021b; Bonoli, Wilson, 2019; Di Maio et al., 2019). In Denmark, we would like to highlight two important institutions, Morsø and Asmildkloster, which are prolific examples. Morsø Agricultural Secondary School has great

farming. It has a farm with own beef, rabbits, goats, horses, chickens and some kind of exotics animal. In-house evaluation of crops have some types of vegetables, e.g.: potato, carrot, beetroot, pumpkin, tomato, cucumber, leek, onion, furthermore growing of cabbages, salads and herbs. The school has a vineyard with 900 vine-planting, apple orchards with 6,000 apple trees, with kind of varieties of apple of different origins, glasshouse. It has a land for grazing or cultivation of wheat, barley, meal, lupine, horse bean. Morsø Handelsgymnasium earned 1st and 2nd price in regional entrepreneurial fair. It was an innovation race with 62 teams, whose were organised among North-Jytlands students ([Morso Agricultural..., 2022](#)). In Asmildkloster Landshule, & Academy of Agricure Busines yearly 100 skilled farmers are graduating, and 425 students are on their way. The school has international cooperation, which are vocational education and training in agriculture and related education. It has the various inputs EUD, EUX, EUV, Students, as well as Agricultural Leadership. Asmildkloster Agricultural School is strengthening development and growth in Danish agriculture through international cooperation ([Asmildkloster's website, 2022](#)).

1.1.2. Austria

The network of agricultural vocational training institutions is very efficient and market-sensitive in Austria. ([Hoidn, Vít, 2021](#); [Bauer, Gessler, 2017](#); [Becker et al., 2020](#); [Hautz, Thoma, 2021](#); [Hautz, 2020](#); [Schlögl et al., 2020](#)). Based on the specificities of the Austrian education system, Vocational upper secondary education in agriculture can be implemented in the following types of institutions in the country ([Atzmüller, Knecht, 2017](#); [Durazzi, Geyer, 2019](#); [Lassnigg, 2017](#), [Schmid, 2020](#)).

- Part-time vocational school – in tandem with company-based vocational training (dual system) (years 10 to max. 13).
- School of intermediate vocational education and training (= school of intermediate VET) (years 9 to max. 12).
- College of higher vocational education and training (= college of higher VET) (years 9 to 13, ISCED 3/5).
- Vocational education and training programmes (=VET programmes) in healthcare professions (1-3 years) ([EC, 2021c](#)).

The 11 institutions concerned in Austria are located within this institutional network framework.

Among the countless good practices, three schools are highlighted below. A Francisco Josephinum Wieselburg trains farmers, agricultural and food technologists and agricultural computer scientists. They research, test and evaluate in the fields of agricultural engineering, digital farming, energetic use of biomass and in food and biotechnology. In addition to education, the Francisco Josephinum has a high-performance research facility in three departments ([Josephinum's website, 2022](#)).

Project: Good practise as a seminar for internal market (cow, sheep's and/or goat's milk).

The progressing of raw milk of cow, sheep, and/ or goat:

- Hygiene operation of diaries.
- Principles of manufacture of cheese.

The following products can be used in the form of best practice models of and manufacture:

- Yoghurt, fruit yoghurt, yoghurt drinks.
- Cottage cheese and dairy spread.
- Soft and Sliced cheese.
- Production of cheese.

HBLA und Bundesamt Klosterneuburg, Wein- und Obstbau considered themselves as a holistic educational place, where the students receive comprehensive training with the most advanced technical learning and the most modern approaches. There are important upgrading professional skills as well as strength of social skills. In this content it is essential to personal liability, independency, and ability for team work. Priority task of the school is detailed knowledge of the theoretical and practical aspects of growing of vine and fruit-growing ([Weinobst's website, 2022](#)). Elixhausen, Salzburg, HBLA Ursprung have been educating young people across Austria. The primary aims are to encourage students to be inquiring, tolerant and positive individuals with an independent mind and strong skills in the field of agriculture and environmental engineering. The educational concept is based on non-progressive teaching and takes a holistic approach allowing us to combine the numerous fields of interest in agriculture, environmental engineering and science. The school has a CSI FOOD project which is investigating the science behind food

production and quality assurance of end products. They wanted to explore a specific application in this area and decided on the quality control of beer: microorganisms are a necessary part of the brewing process, but they can also ruin the beer; careful control of microorganisms is therefore crucial. They approached Stieglbrauerei to Salzburg, where are the largest private brewery in Austria. In combination with the HybriScanD Beer assay (Sigma-Aldrich), a rapid molecular test using photometric detection, they could set up a molecular system for the detection of microorganisms in beer that is now evaluated by Stiegl HBLA Ursprung's website, 2022.

1.1.3. Germany

Young adults in Germany with a vocational qualification have a particularly strong advantage in the labour market: 88 % of 25- to 34-year-olds with upper-secondary or post-secondary non-tertiary vocational qualification are employed compared to 61 % of those with a general qualification and 88 % of those with tertiary education (Hoidn, Vít, 2021). These placement rates make the German institutional system one of the strongest and most efficient vocational education and training systems in Europe, which can be described as a very complex system with a wide variety of different types of training. The *Berufsoberschule* provides two years of full-time education and leads to the *Fachgebundene Hochschulreife* (qualification entitling holder to study particular subjects at a higher education institution). Pupils can obtain the *Allgemeine Hochschulreife* by proving their proficiency in a second foreign language. The *Fachoberschule* requires a *Mittlerer Schulabschluss* and leads as a rule in a two-year course of study up to the *Fachhochschulreife*, i.e. the higher education entrance qualification for the *Fachhochschule*. It equips its pupils with general and specialised theoretical and practical knowledge and skills. The Länder may also establish a grade 13, after successful completion of which pupils can obtain the *Fachgebundene Hochschulreife* and, under certain conditions, the *Allgemeine Hochschulreife* (EC, 2022a).

In Staatliche Berufsschule München probably the farming is one of the most varied and the most interesting work. When the modern farmer is able to lead economically the firm, he/she has got comprehensive view of arable and livestock farming, but in field of marketing, work planning and administration. It is definitely necessary to have well-built theoretical training, what started at the vocational school and it is deepened at technikum. The farming training has 3 years. The first year of the training is continuing with full-time vocational training year (BGJ). The students attend to at vocational school on four days of the week, at one day they spend on traineeships. At the second and third year of the training period the students are on firm training. The students attend to the school at one day per week (Staatliche Berufsschule München's website, 2022).

BBS Lingen also has a preparatory level and the students learn in a dual system. A "Hauptschule" (general school) is a secondary school in Germany and Austria, starting after 4 years of elementary schooling, which offers Lower Secondary Education (level 2) according to the International Standard Classification of Education. Realschule is another kind of secondary school in Germany and Austria. There are many excursions, especially agricultural sector. The school has got many international relationships (BBS Lingen's website, 2022).

2. Materials and methods

Out of 61 schools of five Agricultural Vocational Training Centres operating in Hungary, a questionnaire survey was conducted in three schools of three Vocational Training Centres between 23 November and 13 December 2020. Two of the schools surveyed were awarded the title of Eco-School by the Hungarian Ministry of Education and Culture and the Ministry of Environment and Water. Eco-schools aim to promote environmental education. Environmental education and sustainability play a key role in the local curriculum and pedagogical programme of the school, which strives to operate in the most environmentally friendly way, working with pupils, parents and local communities to investigate and solve local environmental problems. It provides extra-curricular learning opportunities for pupils, such as projects, forest school, field trips.

Due to the pandemic situation, we conducted online education, so we distributed our online questionnaire to our target secondary school students through the heads of the three schools. As the practical field of our questionnaire survey, we chose agricultural vocational secondary schools (which requested anonymity) that we knew to have self-sufficient farming, production, processing and sales units. It was important for us to include schools that were spatially close (within a 100 km radius), but located in different counties and known to us. The total number of questionnaires evaluated was 360. We had 114 students from Jász-Nagykún-Szolnok county,

114 from Bács-Kiskun county and 36 from Csongrád county who completed our questionnaire in an evaluable way. The questionnaire was completed voluntarily and anonymously. The survey is not representative, all grades were sampled. The questionnaire consisted of 21 closed and seven open questions. For the scaled questions, we used both even and odd Likert scale scores (1-4, 1-3).

To process the questionnaire database, the statistical software package IBM SPSS Statistics 20 was used. In addition to the general descriptive nature of the results, we used cross tabulation analysis to explore the dependency relationships between the individual criteria. According to H_0 , there is no correlation between the variables under study. If H_0 is rejected in the analysis, a significant relationship was identified. The existence of a relationship was tested using Pearson's Chi-square. If the significance level of the indicator (Asymp.Sig. (2-sided)) is below the accepted 0.05 % in the social sciences, there is a relationship between the variables under study. To test the strength of the relationship, Cramer's V, Gamma and Eta association coefficients were used.

The strength of the relationships was interpreted as follows:

- 0 - 0.199: weak relationship
- 0.200 - 0.399: moderately strong relationship
- 0.400 - ... : strong relationship.

Principal components and cluster analysis were used to identify the types of students' consumers based on their food purchasing behaviour. On a Likert scale of 1 to 3 (1-Not at all important, ... 3-Very important), the students surveyed rated the extent to which the eleven aspects we provided to play a role in their food purchasing decisions. Principal component analysis was used to reduce the number of variables to filter out multicollinearity between variables and cluster analysis was performed with the factors constructed. The conditions for sorting our variables into factors were performed using the Correlation Matrix, Anti-image Matrix, Measure of Sampling Adequacy, Kaiser-Meyer-Olkin Measure of Sampling criterion, and Bartlett's Test of Sphericity. We used the Varimax rotation for the factor weight matrix rotation and the K-means method for the cluster analysis, and then performed the characterization of the three groups of students along our research questions and hypotheses (Sajtos, Mitev, 2007).

2.1. General demographic characteristics of the sample

65 % of the students surveyed were girls and 35 % were boys. 40 % of the students were aged between 14 and 16, 28 % were aged between 17 and 18, 24 % were aged between 18 and 19 and 8 % were aged 19 and above. Nearly half of the students surveyed live in urban areas (54 %) and half in rural areas (46 %). 81% live at home with their family, only 19 % are in college and 1 % live in rented accommodation. In terms of their monthly pocket money/spending money, 23 % have an average of less than 5,000 HUF, 21 % 5,001 – 10,000 HUF, 18 % 10,001 – 15,000 HUF, 24 % 15,001 – 30,000 HUF and 14 % more than 30,000 HUF (1 EUR = 357 HUF).

3. Results

The majority of students surveyed had negative opinions about the eating habits of their peers, using terms such as unhealthy, bad, self-destructive, fatty, excessive. They eat out most often, with almost half of the pupils surveyed eating daily at the school canteen and buying food from the school canteen. They prefer both familiar and new flavours, but 30 % of them prefer the familiar flavours specifically.

33 % of the students questioned are actively involved in the management activities of their school. 36 % of students and their families regularly buy food produced at school. Schools typically sell raw ingredients (vegetables, fruit, meat), but some of them also have processing plants that produce and sell processed and bakery products. The food purchased is consumed as bought by 37 % of respondents, 52 % use it as a raw material for their main/cooked meals and 11 % use the fruit and vegetables purchased to make jams/preserves/juices/creams.

The family's eating habits are a determining factor for students. Their responses indicate that healthy eating is important to them, and they are likely to rate their family's overall eating habits as healthy. It is important to note that 44 % of the respondents' families grow their own fruit and vegetables, and 12 % also grow for sale. In this way, the family is also passing on important patterns to the pupils, which is reinforced by the complex experience of environmental education and farming activities at school.

In their answers to the open questions, they highlighted the community-building role of school farming, the possibility to put into practice what they had learned in theory, and the love of nature and the profession, as well as the possibility to learn about consumer awareness and the

communal experience of spending time outdoors effectively. According to 77 % of the students surveyed, by participating in school farming, they gain a better understanding of what they have learned in theory, as they can see specific activities, plant development and gain their own experience. In response to some of the open questions in the questionnaire on this topic, students' answers to the question on what they personally find most helpful about this activity: "Well, I get to understand things better and the way I see it, it sticks and everything is much easier." "I can see the task and it is even explained." "It's easier to do the activity afterwards, e.g. weaving a cake." "We can learn our trade in a 'protected' environment on the school's own farm, with our own teachers." "I learn a lot of new skills on the apprenticeship that I will need in life." "We don't just talk about it; we do it and it's easier to understand." "I see how to do a job and I get used to the job, which will come in handy later." 65 % of the students surveyed said that activities with their peers had an important community-building role in their lives and that they had made many friends as a result. A specifically community-building, complementary programme related to farming activities is carried out in nearly half of the schools surveyed. Where no such programmes exist, it is common for students to meet and make friends outside school with other students they have met through joint activities. Of course, in many schools, the TSE activity is compulsory and not optional, so it is not surprising that there are also less motivated students. 57 % of the students who responded are very proud to be involved in the production of local food and do their best to promote it. It is also worth highlighting that 61 % of them say that this activity has given them a great deal of love for the profession they are learning and that they feel very good about working with their teachers and creating value. They see it as a creative exercise and admit that in many cases they are not only listened to but also able to put their ideas into practice.

We also asked how the students thought the food products produced in their school could be improved. They mentioned, for example, that the range of products could be extended to include more products, even if it costs more work and that the work invested pays off. In view of the specific pandemic situation, there were also those who thought that the possibility of ordering online could increase the number of customers. They also saw the possibility of organising "sales" and offering various customer discounts. The organisation of professional programmes, open days and contacts with farmers and companies were considered important. Of course, many students consider the current farming system to be adequate. Only 28 % of students said that it was a conscious decision, as they had always wanted to study at the school they had chosen. On the advice of their family, 42 % chose a vocational school with an agricultural profile. Only 10 % said they had no other choice. This shows how important it is to make the students of the school like the profession they are being taught. The Hungarian vocational schools surveyed are making good progress in this area.

3.1. Typification of students according to their food purchasing behaviour

On a scale of 1 to 3, students were asked to rate how important the aspects listed in Table 1 were to them when making their own food purchases. Principal component analysis based on the averages of the responses received revealed the three groups of factors (factors) identified in Table 1. The importance of the variables within the factors is similar, i.e. respondents who consider health consciousness to be a significant aspect of their purchase, for example, also tend to consider it important that the product they buy is environmentally friendly, comes from organic farming, is of Hungarian origin and is locally produced.

Table 1. Principal component analysis with Varimax rotation

Factors that influence food purchasing	Factor 1	Factor 2	Factor 3
Food should be of Hungarian origin	.833	-.057	.065
The packaging should be environmentally friendly	.771	.193	.040
The product must be locally produced	.713	.257	.022
It should come from organic farming (chemical-free, natural, etc.)	.627	.048	.207
Health consciousness	.599	.378	.187
Awareness of the shop	.048	.778	.255

Recommendation from family and friends	.138	.776	.064
Everything should be available in one place	.146	.649	-.056
Awareness of the food brand	.471	.485	.277
Price	.089	.051	.826
Quality	.178	.153	.802
(KMO=0.802; explained variance 59,6 %)			

For the responding students, three types of consumers were identified based on the factors influencing their food purchasing behaviour during the cluster analysis. The characterisation of each group of students according to the factors is shown in [Figure 1](#).

The first cluster is the "Comfortable Brand Cluster (1)", which includes 105 respondents. Students belonging to this cluster like to buy everything in one place, they care about the store and brand awareness and they give their opinion to the reference persons. The second consumer type is the "Price and Quality-oriented Cluster (2)", which includes 138 respondents. Price and quality are the main food purchasing criteria in the food purchasing behaviour of this segment. The third type of consumer (117 respondents) is the "Hybrid Postmodern Cluster (3)", because in addition to the importance of having everything in one place, they also value Hungarian origin, health consciousness and environmental friendliness. They are value for money and stick to established brands and products. Essentially a combination of the first two clusters.

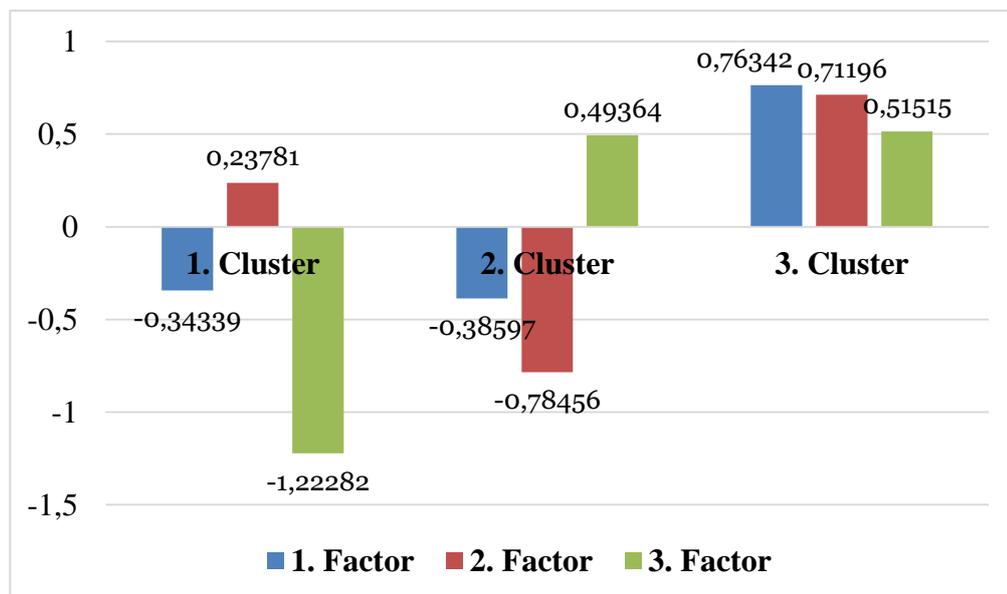


Fig. 1. Characterisation of student clusters by factors

No statistically verifiable correlation was found between students' membership in particular clusters and their demographic characteristics, but our studies suggest that students' lifestyle characteristics influence the type of food buyer they are.

4. Discussion

Within the framework of the EU Green Deal and the Digital age, a profound metamorphosis is taking place within the entire European economy. The significance of the skill set demanded by contemporary agriculture should not be underestimated. These were the inaugural remarks delivered by Wolfgang Burtscher, Director for agriculture and rural development at the European Commission, during his speech at the esteemed event titled 'Farming got talent!', held on the 24th of November, 2022, in Brussels. The overarching objective of the occasion was to emphasise the importance of vocational education and training, as well as to identify the obstacles and effective strategies for cultivating the appropriate competencies necessary for facilitating the transition to a sustainable and resilient agricultural sector within the European Union.

More precisely, the primary objectives of the event were as follows:

1. To identify the requisite skill transformations in the European Union's agricultural sector in order to effectively address the challenges arising from the concurrent green and digital transition.

2. To exchange successful instances of vocational education and training pertaining to sustainable and resilient farming within the European Union while also identifying the encountered challenges.

3. To explore the available tools aimed at supporting the implementation of high-quality vocational education and training programs and fostering synergies (EC, 2022b).

Furthermore, it emphasises the need for extensive and superior research concerning the long-term impacts of school-based food and nutrition education (SFNE), which is an integral part of the 2030 Agenda for Sustainable Development. This research should surpass mere nutritional outcomes and encompass investigations into the most cost-effective combinations of SFNE with other interventions. It also calls for a deeper comprehension of the on-the-ground situation regarding SFNE in different countries, as well as the implementation of formative research to design interventions that are tailored to the specific needs and contexts. (FAO, 2020)

According to the Food and Agriculture Organization (FAO, 2020), SFNE is defined as a series of coherent and progressive sequences of educational activities supported by the environment, which aim to facilitate enduring improvements in the dietary and other food-related practices, as well as in the perspectives and knowledge, of schoolchildren. Additionally, SFNE intends to enhance their capacity to adapt and respond to external changes while enabling them to disseminate their acquired knowledge to others.

The outcomes derived from our questionnaire revealed that 33 % of the surveyed students actively engage in farming activities within their educational institution, whereas the remaining students only partake in such classroom activities sporadically. It is worth noting that the Council of the European Union, recognising the pivotal role of work-based learning and apprenticeship, has set a target for 60 % of vocational education and training (VET) learners in the European Union to undergo work-based learning by 2025. This objective holds particular significance within the agricultural sector, where experiential learning through practical demonstrations emerges as one of the most efficacious means of assimilating new technologies and practices (EC, 2022b). Furthermore, the motivation to partake in these activities exhibits variation among the students. Those who willingly participate in optional farming programs tend to associate farming with a clearly defined positive motivation. For them, farming at school transcends being a mere obligatory task; rather, it is perceived as an immersive process that fosters community building and experiential learning. They take pride in contributing to local food production and strive to advocate for it. They feel good about working with their teachers to create value, to use their creativity and, in some cases, to put their ideas into practice. It is important for them to be able to combine theoretical knowledge with practical experience. Their respect and passion for nature and their profession were clearly evident in their answers. A positive result of our research is that even among the less motivated students, more of them think that school-based farming activities help them to understand and learn the profession they are studying. Drawing upon these findings, we substantiate our initial hypothesis, which posits that school-based self-production activities, coupled with sales, exert a positive influence on the personal development, individual growth, and career socialisation of young individuals. It is evident that experiential learning serves as a significant catalyst in this regard, although further confirmation is warranted.

Across the globe, school-based food and nutrition education (SFNE) is increasingly acknowledged as a pivotal strategy within a comprehensive set of interventions aimed at enhancing the dietary patterns, nutrition, and overall well-being of schoolchildren and adolescents. In line with the recommendations put forth by the Second International Conference on Nutrition (ICN2, 2014) and the United Nations Decade of Action on Nutrition (2016–2025) Work Programme, and motivated by the insights garnered from over three decades of work in this domain, the Food and Agriculture Organization (FAO) embarked on a three-year undertaking to establish the groundwork for SFNE. The objective was to unlock its full potential and effectively address the prevailing challenges in low- and middle-income countries (LMICs) (FAO, 2020). Recent estimations indicate that poor dietary choices now constitute the primary risk factor for the global burden of disease (GBD..., 2018). Globally, 149 million children under the age of five suffer from stunted growth, 49.5 million experience wasting, 40 million grapple with overweight issues, and a significant number face micronutrient deficiencies (FAO et al., 2019). In many cases, these

nutritional issues persist into school-age, particularly in LMICs, where children enter and continue their education while grappling with malnutrition. Consequently, their cognitive and physical potential, as well as overall development, become compromised (Grantham-McGregor et al., 2007; Bundy et al., 2017). It has been observed that there is no significant correlation between students' demographic characteristics (such as gender, age, type of residence, and personal spending capacity) and their food-purchasing behaviour. However, variances in food consumption patterns between males and females do exist in Western cultures. For instance, women tend to consume smaller portions, lighter meals, and delicacies such as vegetables and fruits (O'Doherty-Holm, 1999). Nonetheless, lifestyle characteristics have been found to significantly influence the identified clusters of grocery shopping behaviour.

According to the average of the answers (1 – not at all important... 4 – very important), respect for traditions, travelling and holidays, and belonging to a community are not very important in the lives of students belonging to the "Comfortable Brand Cluster (1)". However, for students in the "Price and Quality-oriented Cluster (2)" and the "Hybrid Postmodern Cluster (3)", these lifestyle characteristics are more important. For all three clusters, the need to party and live a fast-paced life, to follow fashion and trends, the economy, power, religious faith and the opinions of others are not important in their lives. Our study also confirmed that the family was an important reference group in young people's lives and that the LOHAS consumer type mentioned in the literature has emerged, especially for students belonging to the "Hybrid Postmodern Cluster (3)". In contrast to previous domestic research, the food purchasing decisions of the students questioned tended not to be influenced by the opinions of others (with the exception of family and close friends). The part of our second hypothesis concerning the differences in style traits between farming and non-farming students is only partially confirmed, as there are minimal differences between the means of the responses based on the importance of each style trait.

However, research indicates that students who participate in hands-on garden classroom programs exhibit greater concern and awareness regarding resource conservation and allocation compared to non-participants. Moreover, these student garden participants express more positive attitudes towards nature, gardening, and environmental issues (Skelly-Zajicek, 1998; Lohr-Pearson-Mims, 2005). Furthermore, our second hypothesis posited that students involved in school-based farming activities would display healthier eating habits, and this supposition was confirmed through cross-tabulation analysis. The strength of the relationship, as indicated by the Eta correlation coefficients of 0.323, is moderate. Among non-participating students, 20 % do not consider healthy eating important at all, while 44.4 % perceive it as relatively unimportant on a Likert scale of 1 to 4. In contrast, among students actively engaged in school farming, 27.3 % deem healthy eating somewhat important, and 36.4 % consider it highly important. A systematic literature review conducted by Prescott et al. in 2020 summarises and evaluates studies on student outcomes associated with farm-to-school-related activities up to September 1, 2017. The review consistently demonstrates positive impacts on food and nutrition-related knowledge, with many studies suggesting a positive association between farm-to-school-related activities and healthy food selection during school meals, nutrition self-efficacy, and willingness to try fruits and vegetables. However, the impact of farm-to-school activities on fruit and vegetable consumption and preferences remains uncertain (Prescott et al., 2020).

Additionally, students who partake in school garden programs exhibit significant improvements in self-understanding and cooperation to achieve group goals. Their participation is linked to enhanced self-esteem, a better understanding of personal responsibility, improved relationships, and increased involvement with parents and other family members (Alexander-Hendren, 1998). Notably, school garden involvement has also been shown to benefit children with learning disabilities by improving nonverbal communication skills, fostering positive attitudes towards order, and increasing engagement in cooperative tasks (Sarver, 1985). Our research findings highlight the positive impact of school-based farming on personal development, individual growth, and career socialisation. Consequently, we emphasise the importance of schools with an agricultural focus developing or modifying programs to accommodate less motivated students. Traditional classroom activities often involve passive learning, where children engage in reading aloud and listening to their teachers. However, activities conducted in an outdoor garden classroom bring abstract concepts to life through active, hands-on learning. School garden programs utilise various gardening tasks, such as planning, planting, nurturing, and harvesting, to demonstrate the principles of cultivation. In this dynamic learning environment, plants, insects,

birds, and weather all become active participants in the educational process. As a result, children become more engaged, attentive, and motivated to learn.

Furthermore, while school gardens promote creativity, they also provide a structured framework that benefits students academically. Research indicates that students who participate in a garden-based science curriculum, in addition to traditional classroom instruction, achieve significantly higher scores on science achievement tests compared to students in a control group solely exposed to traditional classroom-based learning. This enhanced academic performance associated with garden-based learning is observed in both boys and girls equally (Klemmer et al., 2005).

When addressing less motivated students, it is advisable to use a communication and motivational strategy that takes into account their lifestyle characteristics and food consumption behaviour. The latter is considered important because it is in the light of these characteristics that various school programmes can make an effective attempt to develop health-conscious and environmentally aware food consumption behaviour.

Based on our research experience and findings, we have developed a generic and adaptable concept for the creation of student enterprises. The current state of the EU agri-food sector's workforce reveals a prevalence of low-skilled individuals, with approximately 68 % of farm managers relying solely on practical experience, while only 22 % of younger managers possess full agricultural training. This highlights a significant qualification gap within the industry.

- Over 40 % of the agricultural workforce in the EU is either underqualified or overqualified, indicating a mismatch between qualifications and job requirements that surpasses similar disparities in other economic sectors. The reluctance of the adult agri-food workforce to engage in lifelong learning exacerbates this issue, resulting in low participation rates in vocational education and training programs.

- The structural transformations occurring in EU farms, coupled with the imperatives presented by the twin green and digital transition, necessitate a reevaluation of the demanded skill sets. Digital literacy, environmental management, and entrepreneurship are emerging as pivotal competencies. Consequently, education systems, training requirements, and informal learning opportunities must be adjusted to bridge these skill gaps.

- However, various barriers to learning, such as costs, time constraints, accessibility, inclusiveness, and infrastructure limitations, must be carefully considered when formulating a comprehensive policy mix that can enhance the attractiveness and responsiveness of agriculture-related vocational education and training. These measures are crucial for meeting both the short-term and long-term needs of the sector (EC, 2022b). During the presentations, a diverse range of teaching and learning approaches embedded within the context of EU agriculture and rural areas were showcased. Each presentation underscored the pivotal role that vocational education and vocational schools could play in enabling a more intelligent and sustainable agricultural sector (EC, 2022b).

Our primary aim is to foster the development of young people engaged in agricultural vocational training by cultivating their attitudes towards health consciousness, environmental awareness and becoming informed consumers of food. Moreover, we strive to enhance their individual and career sociability. This pedagogical initiative, known as the "School Farm," lies at the heart of our project design. The integration of farms or professional workshops within agricultural schools in France exemplifies the significant advantages associated with such an approach. These facilities offer valuable practical experiences to students while also serving as spaces for local professionals to experiment and develop their knowledge and skills. It provides farmers with opportunities to learn novel techniques and practices, including the application of research findings (EC, 2022b). While school gardens and garden-based learning are not novel concepts within American education, they have garnered considerable popularity and attention in recent years (Hirschi, 2015). The United States Department of Agriculture's 2015 Farm-to-School Census revealed a substantial increase in the number of school gardens, with 7,101 recorded in school districts across the country, compared to 2,401 recorded in 2013 (USDA, 2015). Positioned within the broader frameworks of alternative food networks (Goodman, DuPuis, 2002) and place-based education (Sobel, 2004), school gardens manifest in various forms and serve diverse objectives (Cramer et al., 2019).

In order to establish enduring healthy eating habits, children and adolescents require regular access to nutritious foods, positive influences from caregivers and peers, as well as the development of skills and motivation. Schools play a vital role in this process, as key moments both

within and outside the classroom present opportunities for young individuals to learn about the functioning of food systems and to acquire the skills necessary for improving their dietary choices (FAO, 2022).

The pedagogical potential of garden-based education in enhancing academic outcomes has been extensively documented (Graham et al., 2005; Passy, 2014). Furthermore, empirical evidence demonstrates the positive and measurable impacts of school gardens on increasing fruit and vegetable consumption and promoting physical activity levels (Berezowitz et al., 2015; Blair, 2009; Lautenschlager, Smith, 2007).

Additionally, school gardens serve as sites of potential resistance against the erosion of knowledge and skills related to food production, preparation, and consumption—a phenomenon known as food system deskilling (Carlsson, Williams, 2008; Howes et al., 2009; Stone, 2007; Cramer et al., 2019).

During our previous research (Bakos, 2019), we had the opportunity to engage in discussions with several farmers who expressed their greatest challenge as the lack of knowledge concerning the legal environment, as well as basic economic, financial, and business skills. Hence, the secondary objective of our project is to equip students with professional knowledge pertaining to agricultural cultivation and processing, along with entrepreneurial skills that will facilitate their entry into the labour market. Additionally, the project aims to foster the development of students' social competencies. To achieve this overarching vision, new paradigms are required, surpassing the transmission of basic and generic nutrition information solely within the confines of the classroom. Instead, hands-on learning, skill development, the utilisation of various media and technologies, and opportunities to engage with food in real-life settings such as canteens, markets, playgrounds, homes, and communities should be promoted (FAO, 2023).

A brief summary of the "School Farm" project:

- Competences to be developed: entrepreneurial, social, logical, personal development, science, etc.

- Target group: students in Grades 10-13

Depending on the specific project idea, 5 to 10 students may be involved. The groups would be mixed along demographic characteristics (gender, age, social background, etc.) The positions needed to run the project-like "student enterprises" would be filled by the students with the help of the teacher, taking into account their individual ideas and abilities.

- Framework for implementation: the student enterprises' project-based pedagogical activities would take place in the framework of vocational training and apprenticeship courses.

- Duration: the student enterprises will be mainly engaged in agricultural production and marketing activities, and therefore the student enterprise project will cover a full year, from planning to implementation.

- Person to assist in its implementation: preferably a teacher with experience in project pedagogy, both theoretical and practical.

- The student enterprise project process:

Once the necessary institutional and parental approvals and support have been obtained and the student teams have been established, the project tasks and associated educational and curricular objectives of the student enterprise project are set out in the Table 2. Each step is coordinated with the students by the teachers who sponsor the programme, but at each level, experts from the teaching staff or from the market can be called in to provide advice and support.

Table 2. Educational and curricular objectives of the "School Farm" project

S/N	Project task	Educational objective	Curricular objective
1.	The name of the enterprise, the scope of its activities.	Encouraging creativity Developing cooperation Developing assertive communication Develop decision-making skills	Economic and legal basic knowledge Communication + Subjects related to problem solving
2.	Developing a detailed business plan for the enterprise:	Strategic planning development Operational planning	Economic and legal basic knowledge Communication

	<ul style="list-style-type: none"> - Executive summary - Description and vision of the enterprise - Definition of the market - Description of products and services - Operating plan (business plan) - Organisational structure and management - Marketing and sales plan - Description of the financial plan - Annexes 	<ul style="list-style-type: none"> development Putting theoretical expertise into practice Stimulating creativity Developing collaboration Developing assertive communication Developing decision-making skills Recognising and managing responsibility and risk 	<ul style="list-style-type: none"> Agricultural knowledge + Subjects related to the assignment
3.	Presenting the business plan	<ul style="list-style-type: none"> Encouraging creativity Developing communication and presentation skills 	<ul style="list-style-type: none"> Communication Marketing + Subjects related to the assignment
4.	Running the enterprise	<ul style="list-style-type: none"> Practising professional skills Developing cooperation Developing assertive communication Develop decision-making skills Recognising and managing responsibility and risk 	<ul style="list-style-type: none"> Communication Agricultural knowledge + Subjects related to the assignment
5.	Discussion and presentation of results and experiences.	<ul style="list-style-type: none"> Encouraging creativity Developing communication and presentation skills 	<ul style="list-style-type: none"> Communication Marketing + Subjects related to the assignment

Evaluating of the work done in the student enterprise:

The students are in constant communication with their colleagues in the programme, who provide evaluation and feedback to the students after the completion of each project task and help them move to the next level.

The programme described in the study is still to be implemented, but its design, precisely with a view to future attitude development, offers the possibility of differentiated levels of task implementation. In our programme design, it is possible to emphasise the individual steps and tasks, depending on whether or not the student has already been involved in an independent production project task.

Our publication is, therefore, a preliminary study with the aim of exploring the relevance of this type of programming: specifically, the impact that participation in farming processes can have on learners' consumer attitudes.

In this sense, the "Student Enterprise" programme we have proposed can be seen as a strong catalyst. Our planned programme builds strongly on the development of an intrinsic motivational set: in the practical project, the personality of the students is shaped and turned towards a promising, balanced, future conscious consumer behaviour through their own positive experiences. This experience of farming, which has excellent complex professional and pedagogical objectives, could be complemented in the future by an action plan we have designed, the sustainable "Student Enterprise" project, which will place the practical activities of schools with an agricultural profile in a broader context. A broader adaptation of the programme to schools in the future is also planned.

5. Conclusion

In our study, we provided an overview of the food purchasing and consumption characteristics of young people studying in Hungarian agricultural secondary schools. The results show that the educational system has an important role and responsibility in educating our young

people to become conscious consumers. Self-managed schools have a positive impact on students' consumer behaviour, they help them to understand and learn their profession and they have a strong community-building function. It is also found that children from farming families have a stronger motivation and commitment to agricultural occupations and careers and that parental patterns of socialisation are reflected in their behaviour. Vocational education and training are currently undergoing reform in Hungary. In its Vocational Education and Training 4.0 Strategy (2019), the Ministry of Innovation and Technology has set out priorities (infrastructure development, high-quality, modernly equipped sectoral basic training workshops, creation of conditions for dual training, development of educational technologies, scholarship schemes for teachers and students, career paths, etc.) that can make the operating conditions of the schools under review even more efficient, sustainable learning and teaching processes in all aspects, and the output of professionals who respond to labour market needs. From a content point of view, we consider it important to give more emphasis to project-based pedagogical methods in the curriculum design of schools, and therefore we have prepared a simple and adaptable student enterprise design called "School Farm".

The project elements summarised in the [Table 2](#) can be interpreted as part of a whole system, but also as separate elements, modules. We consider it important to mention that the development of the competences behind the steps is one of our most important objectives, because the good action patterns, skills and abilities that can be integrated into the personality of the students will not only be useful in the world of learning and work, but will also be able to have an impact on the way of life of adults and to develop a certain value approach in our young adults. Among other things, the secondary and tertiary socialisation patterns we offer can be linked to the eating preferences of the home and family in a plastic way to help achieve a positive, healthy and conscious eating behaviour in the future. However, the socio-demographic distribution of our sample is heterogeneous, so the strength of these parenting patterns is influenced by multiple factors and not in the same direction and intensity.

We do not consider the possibility of dropping out as a relevant variable in the assessment of the effectiveness and efficiency of our programme design: in our opinion, the presence in the programme, the learning by doing, has an important role in the development of the "germs" of healthy and conscious eating behaviour, the essence of which is the experience of success through independent practice and empirical experience. We consider this process to be the most important, experiential learning, on which it is conceivable that further socialisation patterns can be more strongly built if the learner is in the agricultural sector, but we believe that this direction can also be developed in the case of career leavers, since the patterns of life management (daily meals, shopping habits, product preference, etc.) are present in the learners' lives in the context of daily routine, independent of the nature of their work.

The idea of student enterprise would also orient students towards autonomy and proactivity, and of course, not only those who are already involved in this type of process.

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