Weed control with GPS-controlled chopping robots

Co-funded by the Erasmus+ Programme of the European Union

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This project aims to create a responsive learning programme that deals with the development and use of GPS-controlled hoeing robots for weed control.

The learning programme is designed to cover both theoretical and practical aspects in order to give learners a comprehensive understanding of this innovative technology.

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The project objective is:

- To promote practice-orientated skills in the use of chopping robots.
- On completion, students should be able to operate chopping robots independently and evaluate their efficiency.

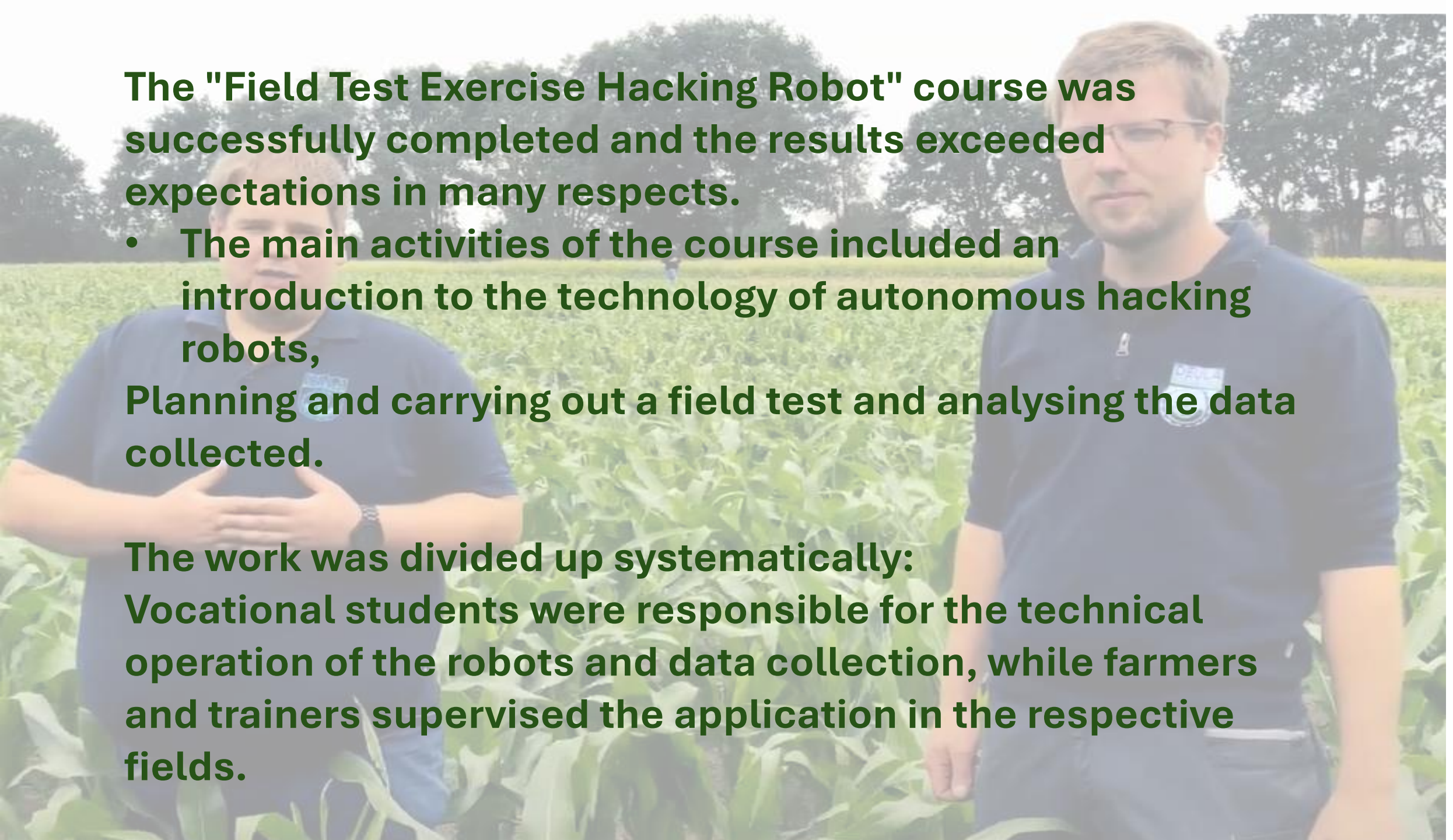
Advantages over traditional teaching methods:

- The practical approach of the project enables a deeper understanding of the technology compared to traditional methods.

- More learning outcomes are achieved because learning takes place in real-life scenarios.

Brief introduction to the microcourse

- Project description
- Project goals
- Project content
- Technologies and resources
- Timetable
- Conclusion



The "Field Test Exercise Hacking Robot" course was successfully completed and the results exceeded expectations in many respects.

- The main activities of the course included an introduction to the technology of autonomous hacking robots,

Planning and carrying out a field test and analysing the data collected.

The work was divided up systematically:
Vocational students were responsible for the technical operation of the robots and data collection, while farmers and trainers supervised the application in the respective fields.

There was intensive co-operation between the vocational students, the teachers and the farmers.

The practical use of the hacking robots and the involvement of the trainers made it possible to achieve an interdisciplinary working method.

The students benefited from the combination of theory and practice, as they were able to apply the knowledge they had acquired directly in the field.

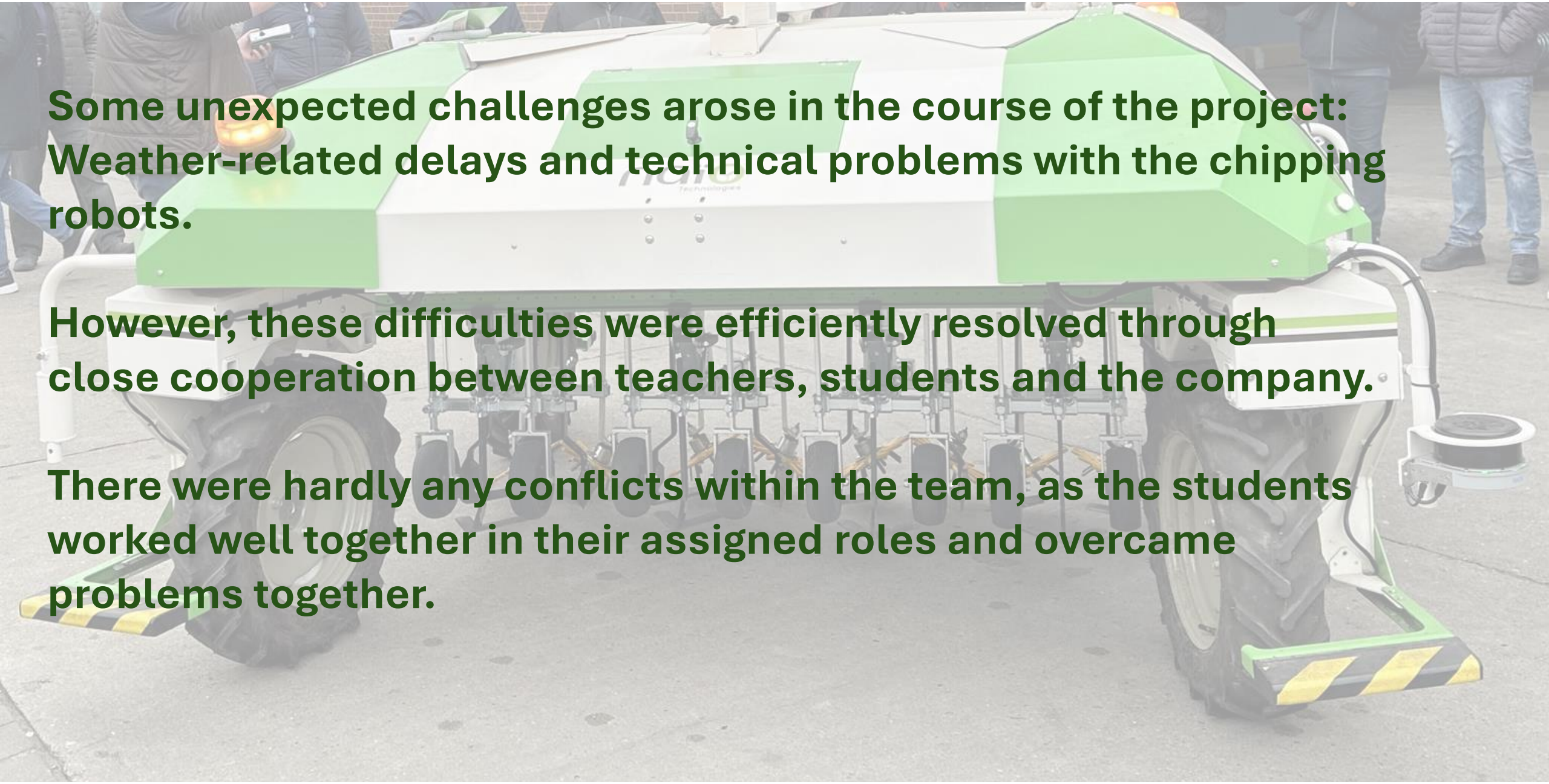
Digital tools and GPS-based systems were essential.

Several materials and tools were needed to realise the project:

- Hacking robots, tablets for data analysis and the GPS system for precise navigation of the robots.
- These resources were provided by the school and the participating farmers.
- The costs of using the robot technology were largely covered by the company that provided the robots, while the school provided the technical support.

- The successful involvement of an external company, which supplied the robot technology and provided support in the event of technical problems, deserves special mention.

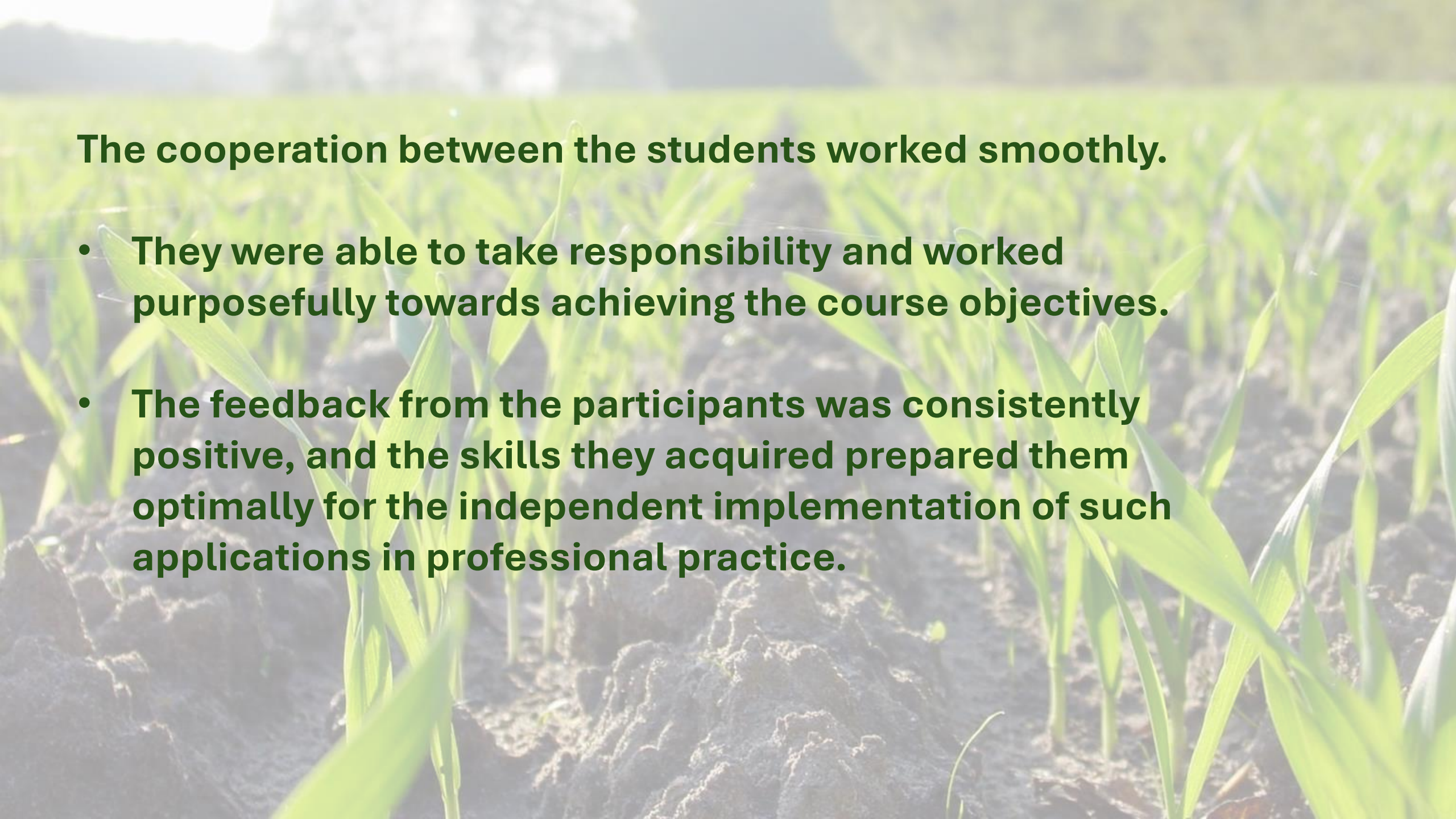
- This enabled the students to work hands-on with the latest technology and gain valuable insights into the agricultural practice of the future.



Some unexpected challenges arose in the course of the project: Weather-related delays and technical problems with the chipping robots.

However, these difficulties were efficiently resolved through close cooperation between teachers, students and the company.

There were hardly any conflicts within the team, as the students worked well together in their assigned roles and overcame problems together.



The cooperation between the students worked smoothly.

- They were able to take responsibility and worked purposefully towards achieving the course objectives.
- The feedback from the participants was consistently positive, and the skills they acquired prepared them optimally for the independent implementation of such applications in professional practice.

Feedback from the students on the project work and the learning outcomes:

- **The feedback from the pupils was very positive overall.**
- **They emphasised that the practical work with the chopping robots was a valuable addition to the theoretical training and that they This enabled them to develop a better understanding of the use of modern technologies in agriculture.**

- **The opportunity to learn in real-life situations was particularly emphasised, which significantly deepened the understanding of technical processes and challenges.**

Both a team evaluation and a self-evaluation took place:

In the team evaluation, the students reflected on their collaboration, the division of labour and the progress of the project. They agreed that the clear allocation of roles and open communication within the team were crucial to the success of the project.

In the self-evaluation, many stated that they had significantly improved their technical understanding and problem-solving skills. However, some students reported that they initially felt unsure about using the new technology, but that this improved as a result of the practical experience.

Experience of the team (students):

Practical application of theory:

Working with the chopping robots showed the students that practice is often more complex than theory and requires quick adjustments. They learnt flexibility and problem-solving skills.

Teamwork:

- The importance of clear communication and division of labour became clear.
- Successful collaboration proved to be the key to the project's success and strengthened future team competences.

Technological progress:

The use of the hoeing robots deepened their understanding of modern agricultural processes and emphasised the importance of innovation in agriculture.

Conflict resolution:

Challenges and conflicts in the project provided learning opportunities to resolve tensions and tackle problems in a structured way, which strengthened their social and problem-solving skills.

Teacher experience:

New learning methods:
Project-based learning not only promoted specialised knowledge, but also interdisciplinary skills and enabled deeper learning processes.

Digitisation:
The use of chopping robots demonstrated the importance of digitalisation in agricultural training and strengthened the role of teachers as promoters of these skills.

Student-centred learning:
Working independently and taking responsibility increased the students' motivation and interest and will influence future teaching strategies.

Co-operation with external partners:
The involvement of companies strengthened the practical relevance and opened up new opportunities for innovation in the training programme.

Progress in interdisciplinary competences was continuously monitored and evaluated.

- <u>Self-knowledge and self-assessment:</u>
  The students reflected on their learning processes, recognised strengths and weaknesses and adapted their work accordingly. Many confirmed in the self-assessment that they had better understood their learning methods.

- <u>Discussion skills:</u>
  The teamwork encouraged discussions in which they improved their communication skills and the handling of constructive feedback.

Ability to act and communicate:

- The students were responsible for carrying out the field test and solving any problems that arose. Many stated that their ability to act calmly and purposefully in difficult situations improved as a result of the project.

- Working with external partners (such as the contractor who provided the fields for weeding with hoeing robots) further enhanced their communication skills as they learnt to interact effectively with different stakeholders.

Thank you for your attention!

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