

Crop Pest Diagnosis and Crop Pest Management

Teaching and Learning Implementation Case Study

Contents

Summary	1
Value of the case study to teaching and learning practices.....	1
Background and context	1
Relevance of course materials to a higher education context.....	2
Implementation and impact in teaching practice	3
Challenges	5
Discussion questions	5
Conclusions	5
References.....	6
Further reading	6

Summary

This case study explores how an Egypt-based higher education professor of plant pathology is incorporating materials from the CABI developed self-led, online courses [Crop Pest Diagnosis](#) (CPD) and [Crop Pest Management](#) (CPM), into classroom-based teaching and learning practices. This case study identifies opportunities and challenges of practically applying these materials in a classroom setting, when the materials have principally been designed for an online environment that is not tied to a specific national curriculum.

Value of the case study to teaching and learning practices

To provide a practical example of how an educator has adapted CPD and CPM course materials for use in teaching and learning practice.

Background and context

CABI have developed the CPD and CPM digital learning products to provide self-led, online training for educators, students, and those working in farmer advisory roles. Subject matter and instructional design experts at CABI have designed the courses to provide a methodology for recognising, diagnosing, and managing plant health issues in a wide range of geographical contexts.

Dr. Ahmed Bondok is a professor of plant pathology at Ain Shams University in Egypt. After finding it difficult to source high quality and trusted teaching and learning materials for the diagnosis and management of plant health issues elsewhere online, Dr. Bondok discovered the

CPD and CPM courses through his professional network. As part of a scholarship initiative from CABI, in collaboration with the Egyptian Knowledge Bank (EKB), Dr. Bondok has been using information and resources from the courses as part of a blended learning approach in his teaching practice.

He has found that the courses help to bridge the gap between theory taught in the classroom and diagnosing and managing plant health issues found on plants grown in the climate-controlled greenhouses onsite at the university (Figure 1).



Figure 1. Dr. Bondok inside a climate-controlled greenhouse growing tomatoes at Ain Shams University, Egypt, [Greenhouse location](#). Photo: Dr. A Bondok. © Ain Shams University.

Relevance of course materials to a higher education context

Dr. Bondok reviewed the course materials, completing both courses himself; working through the CPD course first, followed by CPM.

Course materials were checked for relevance against the set curriculum at Dr. Bondok's institution. He also checked for alignment to his own understanding of the concepts covered in the courses, establishing how best to integrate the teaching materials into his own teaching practices for these topics at a higher education level.

As the courses have been designed for a global audience, rather than for a specific location, Dr. Bondok found that some of the plants, pests and diseases were unfamiliar to students. However, the core principle of the elimination methodology included in the CPD course has been an effective principle to help teach students to focus on specific symptoms when diagnosing plant health issues. The broad range of examples included in the course has given

students opportunities to practice these diagnosis skills to a wider range of crops than students may otherwise have access to.

The CPD course in particular has been of most relevance to Dr. Bondok, with the nutrient deficiency topic in particular helping to support and supplement existing teaching materials.

Implementation and impact in teaching practice

Dr. Bondok found that [The Diagnostic Field Guide](#), a freely available PDF book that accompanies the two courses, was a particularly useful resource. Students were directed to this resource and the course materials were used by Dr. Bondok to inform and update classroom-based teaching materials.

Dr. Bondok found that the Diagnostic Field Guide resource could be used by students when practicing their diagnostic and management skills in the onsite greenhouse at the university (Figure 2). Students were asked to look at the type of symptoms displayed in the course and PDF resource, and to compare these against symptoms observed on the plants growing in the greenhouse. Using the resources in this way, Dr. Bondok found that the course and the associated resources were providing a bridge between the theory taught in the classroom, and the application of this theory in a practical setting.



Figure 2. Students checking the health of tomato plants at Ain Shams University, Egypt, [Greenhouse location](#). Photo: Dr. A Bondok. © Ain Shams University.

Eventually, a structured three stage approach emerged in implementing the CPD and CPM courses into teaching practices:

- 1) Integration of course materials and the diagnosis methodology into classroom-based teaching materials, e.g. PowerPoints presented to students in a lecture setting.

- 2) Students are directed to specific sections of the CPD and CPM courses to help reinforce classroom-based teaching. This approach provides variety in the context in which a skill is practiced, helping learners to more easily retrieve information in a wider variety of contexts (Tulving and Thompson, 1973).
- 3) Students use the resources from the courses to aid in their diagnosis in a practical, hands-on greenhouse-based setting, using teaching staff as a secondary resource to confirm their diagnosis after consulting the course materials in the first instance. This provides a scaffolded learning experience, helping learners to complete tasks successfully with the relevant level of guidance and support that will help them to move towards the desired skill level (Vygotsky, 1978).

This approach allows learners to recognise the value in consulting trusted sources of information, prepares them for becoming proficient and confident in practicing a well-established methodology in crop health diagnosis, and also reduces the pressure on teachers, who are able to take a more supportive role in offering guidance to students when in practical settings.

Challenges

Out of the two courses, the CPD course has so far provided the highest level of value to Dr. Bondok in his teaching practices. He feels that the structure of the CPM course could be improved to better help students understand the link between diagnosis and management. Changes to the structure of the CPM course would help him to more effectively integrate the course materials into the structure of his own classroom-based teaching resources.

The interactive nature of the course materials also means that it can be difficult to integrate the learning directly into classroom-based formats, such as PowerPoint presentations. A downloadable resource that includes copyright approved pictures that can be easily copied into presentations may be a more effective format for teachers to use. There may also be other CABI resources, such as The Diagnostic Field Guide that could be adapted and incorporated into different sections of the course as teacher specific resources to help with field-based practice.

Discussion questions

1. How could course materials be used as a flipped learning (Crouch and Mazur 2001) tool? Suggest a different structure to the one outlined in this case study that could be used to implement course materials into a higher education setting.
2. What are the limitations of using learning resources that have been designed for a self-led learning environment when applied in a face-to-face learning environment? Suggest ways in which these limitations could be mitigated against.
3. How can learning resources designed for a global audience be contextualised to meet the needs of specific locations? Outline the benefits of location-based contextualisation.
4. Are courses designed for a global audience a more suitable learning tool for preparing students for the regional and/or global job market, rather than preparing them only for the local job market? Justify your position with examples.

Conclusions

CABI's CPD and CPM courses offer a quality, trusted resource that can be used to supplement and support existing teaching and learning practices in higher education settings. Dr. Bondok has developed an effective three stage structure to integrate the course materials into his teaching

practice, which include: adapting course materials for classroom-based teaching, directing learners to specific parts of the courses for virtual practice, and reinforcing skills and knowledge, using course materials as a practical field-based resource.

The courses are used as a way to reinforce theory taught in the classroom, and help students to refer to resources rather than rely as heavily on teacher time during the practice of knowledge taught to students in a classroom setting.

Whilst the content in the courses are highly relevant to students of plant pathology and related subjects, the global reach of the courses can mean that the examples included within the courses lack relevance to specific locations. Teachers may need to contextualise, adapt materials or direct students away from course materials that may not be relevant to them. Including more diverse examples, or setting clearer expectations around how the course should be used as a way to practice principles rather than as a complete encyclopaedia of specific plants may help to make the course more effective as a teaching resource.

References

Crouch, C., & Mazur, E. (2001). Peer Instruction: Ten Years of Experience and Results. *American Journal of Physics*, 69, pp.970-977.

Tulving, E. and Thompson, D. M. (1973). Encoding specificity and retrieval processes in episodic memory, *Psychological Review*, 8 (4), pp. 352-373.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Further reading

Beetham, H. and Sharpe, R. (eds.). (2019). *Rethinking pedagogy for a digital age: Principles and practices of design*. 3rd ed. Boca Raton, FL: CRC Press.

Dirksen, J. (2015). *Design for how people learn*. 2nd ed. Upper Saddle River, NJ: New Riders Publishing.

Neelen, M. & Kirschner, P. A. (2020). *Evidence-Informed Learning Design: Creating training to improve performance*. London: Kogan Page. p.223.

Wild, J. & Nzegwu, F. (2022). *Digital Technology in Capacity Development: Enabling learning and supporting change*. South Africa: African Minds.