WOMEN IN AGRI-TECH

Improving participation in the future of farming

Best Practice Guide

for Effective Engagement Between Teachers and the Agricultural Industry

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Ten top tips for teachers

1. Seek out industry contacts by approaching companies at local field days and agricultural shows or ask for recommendations from rural supplies stores or stock and station agents.

2. Get up to speed on new technologies by reading articles from media outlets e.g. print, social media, to see what's happening in the industry. Many industry groups publish relevant information regularly.

3. Take advantage of free trials or ask about discounted education packages before committing to purchasing the technology.

4. Before you purchase an agri-tech tool or system, ask to speak to a farmer or other end user who has experienced the technology themselves and get their feedback on how it is working on their property.

5. Just because you've contacted an industry rep it doesn't mean you have to commit to purchasing or collaborating further if it doesn't suit you or your school.

6. Don't expect the industry rep to respond to your questions overnight, these things take time. Often several levels of approval are required before they can reply.

7. Keep in mind new companies and start-ups often can't afford to give schools everything for free.

8. Agri-tech tools and systems aren't made for education so don't always expect a perfect fit straightaway. Commercial products are often unable to accommodate multi-user access and may take some work to modify for the classroom.

9. Collaborate with schools in your area to share resources and costs.

10. Your industry guest speaker should not be expected to run your class on their own, facilitation is required, and you will need to be there to keep the class on track.

Ten top tips for industry

1. Initiate contact with schools by approaching them directly, contacting members of the school council or getting in touch with the Agricultural Teacher Association in your State or Territory.
2. Be open to working with teachers from a range of disciplines. Food and fibre encompasses a range of subjects (e.g. geography, science, business), not just agriculture.
3. Not all teachers have a background in agri-tech or agriculture in general. Find out what they do and don't know and help build their knowledge and confidence.
4. High school teachers will want to focus on one subject area for an individual resource, but this doesn't mean the technology doesn't have application to other disciplines within a school.
5. Consider how your software/tech can be applied in a school setting. Modifications such as individual accounts for each student and downsizing for small ag plots will be needed.
6. Teachers often want the option to view student's work and ensure they can make changes that don't change the master data or software file.
7. School farms are not commercial operations and their ag plots are generally small (if they are lucky to have one at all).
8. Create real-life context by connecting commercial farms that are using your product with schools so they can see how the technology is being used to make improvements.
9. Understand schools rarely have large budgets for their agricultural programs to purchase agri-tech tools and systems.
10. Don't assume all schools have reliable internet coverage or access to devices, such as iPads and laptops.

Introduction

New and emerging technology is an exciting and rapidly expanding part of the agricultural industry. Developing collaborative partnerships between the education and the food and fibre sector is vital to ensure the next generation workforce is not only inspired to consider further study and a career in the industry but have started to develop the skills and knowledge required.

There are numerous ways for industry and education professionals to work together. One option is through the development of agri-tech learning modules. They not only raise awareness about innovations in agriculture, but match student interest and motivation to learn about modern science, technology, engineering and maths (STEM) principles with how they are applied in a real-world context.

Exposing students who have never considered a future in agriculture to real-world applications of STEM throughout the industry can motivate them to consider future career options in the sector. Likewise, industry get benefits in the form of exposure to a broad audience that may go on to influence and contribute to the sector in the future. Students are known to take what they have learnt about agri-tech tools and systems at school and share at home with their family farm, thus increasing pathways of adoption. Additionally, students who go on to have a career in agriculture will already be familiar with and have some of the required skills and knowledge of how to use agri-tech to improve agricultural production.

The ‘Women in Agri-tech’ project will create and foster a strong network of female teachers who will become leaders in digital literacy, STEM and entrepreneurship in regional, rural and remote areas. They will be guided by female researchers, professionals and entrepreneurs to develop engaging learning resources which will in turn inspire girls in the classroom to realise the opportunities available to them.

Many agricultural industry organisations are enthusiastic about collaborating with teachers but do not always have the contacts, experience or time to commit to initiating the partnership. Likewise, many teachers lack a background knowledge or contact networks within the agri-tech field, making it difficult to create engaging materials for their students.

The following best practice guidelines are designed to help form effective partnerships between industry and education, so they can develop engaging learning modules for students to build skills and knowledge in the application of current and emerging agri-tech tools and systems in the food and fibre sector. The guidelines are a culmination of recommendations and issues raised by both teachers and industry representatives who participated in the ‘Women in Agri-tech’ program.

It is important to note that each partnership is unique and there is not one single model that will suit all relationships. The outcomes from the ‘Women in Agri-tech’ research identified six common areas that lay the foundation for positive teacher-industry relationships.

1. Communication

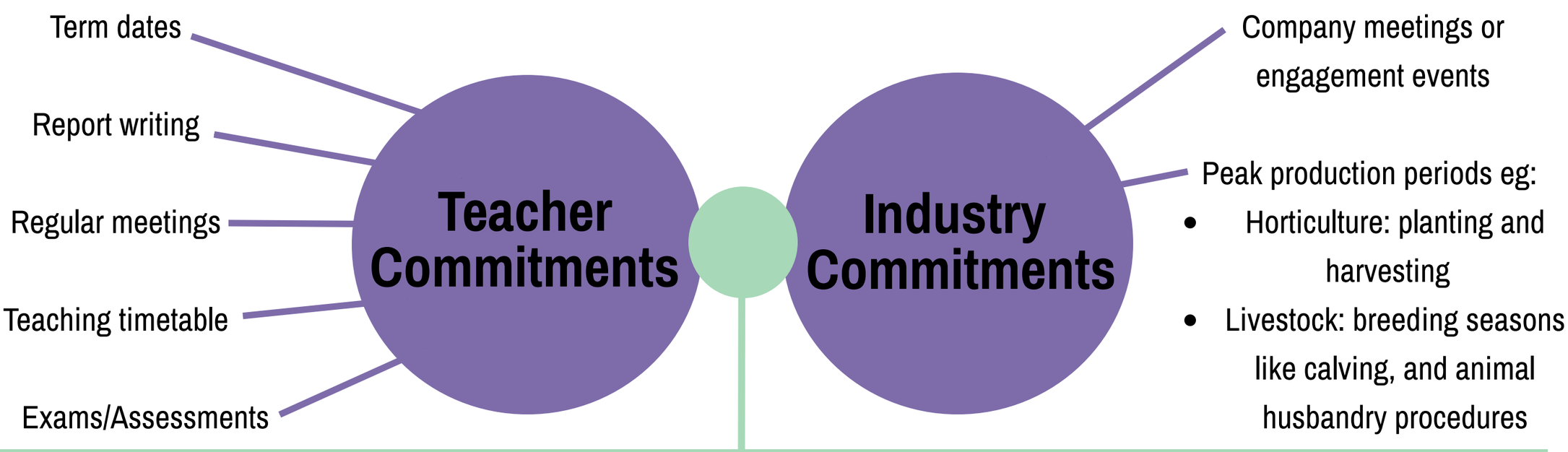
Communication is essential for all good relationships, both professional and personal. Miscommunication can lead to conflict and inefficiencies in getting things done. The following guidelines can assist to establish positive and effective teacher-industry partnerships.

1.1 Agree on an overarching communication structure	• Establishing expectations about communication early in the partnership is recommended, including the preferred communication type (face-to-face meetings, phone calls, emails, reports), that allow for regular contact and discussion.
1.2 Decide on communication frequency	• Partners should engage in some form of communication at least monthly during the development of the learning material. Increased contact may be required initially or if extra support is needed.
1.3 Initiate at least one face-to-face meeting	• To establish and maintain effective communication, at least one face-to-face face meeting is recommended. This can include technology assisted meetings such as Zoom and Skype. • There are several benefits of face-to-face interactions including: • Body language assists with understanding each other's reactions and feelings towards the topic being discussed • Decisions are made faster during face-to-face interaction and conversations can progress faster and reach greater outcomes than online • People are generally more engaged and collaborative in face-to-face meetings
1.4 Plan communication type based on topic importance	• With many ways to communicate it is easy to resort to the convenience of email and SMS. Not all communication methods are suitable depending on the message being delivered or topic to be discussed. • A general guide is to use email or SMS for low priority topics, telephone for medium priority topics and face to face meetings, either in person or via video conference, for high importance topics.
1.5 Understand each other's communication style	• Everyone has their own way of communicating, which includes both delivering and receiving information. Psychologists have identified four main communication styles. Understanding your style and that of those you work with can improve how effective your relationships are. • If you don't already know your communication style, you can complete a "communication style" online quiz and then advise your partner on your preferred communication style.

2. Time Management

Time management when managing multiple priorities and being conscious of each other's commitments is important. Specific to engagement between teachers and industry professionals, the following recommendations relate to establishing effective time management practices.

2.1 Establish time available to commit to the project	• For most people, the partnership will be additional to their regular workload and will compete with other priorities. Being mindful of each other's commitments, especially at certain times of the year, allows partners to be aware of periods of increased demand. • Agricultural industries generally have peak times of activity (e.g. planting, harvesting, mustering, calving). Equally, teachers have times of increased demands (e.g. assessments, report writing, parent interviews). • Discuss with your partner how much time each can commit and when (e.g. suitable/unsuitable times of the year).
2.2 Draft a schedule of activities	• Considering the project activities that need to occur, identify what needs to happen and when. Align these with each other's time available for the project. • Online platforms that allow multiple users to edit and add activities can assist preparing a shared schedule, such as Google docs or TeamWork.
2.3 Be flexible to accommodate unexpected changes and delays	• Even with the best laid plans, change is inevitable. • Re-structuring requires flexibility and understanding. If a meeting is cancelled, reschedule its replacement at the time of the cancellation to ensure the meeting doesn't get forgotten.



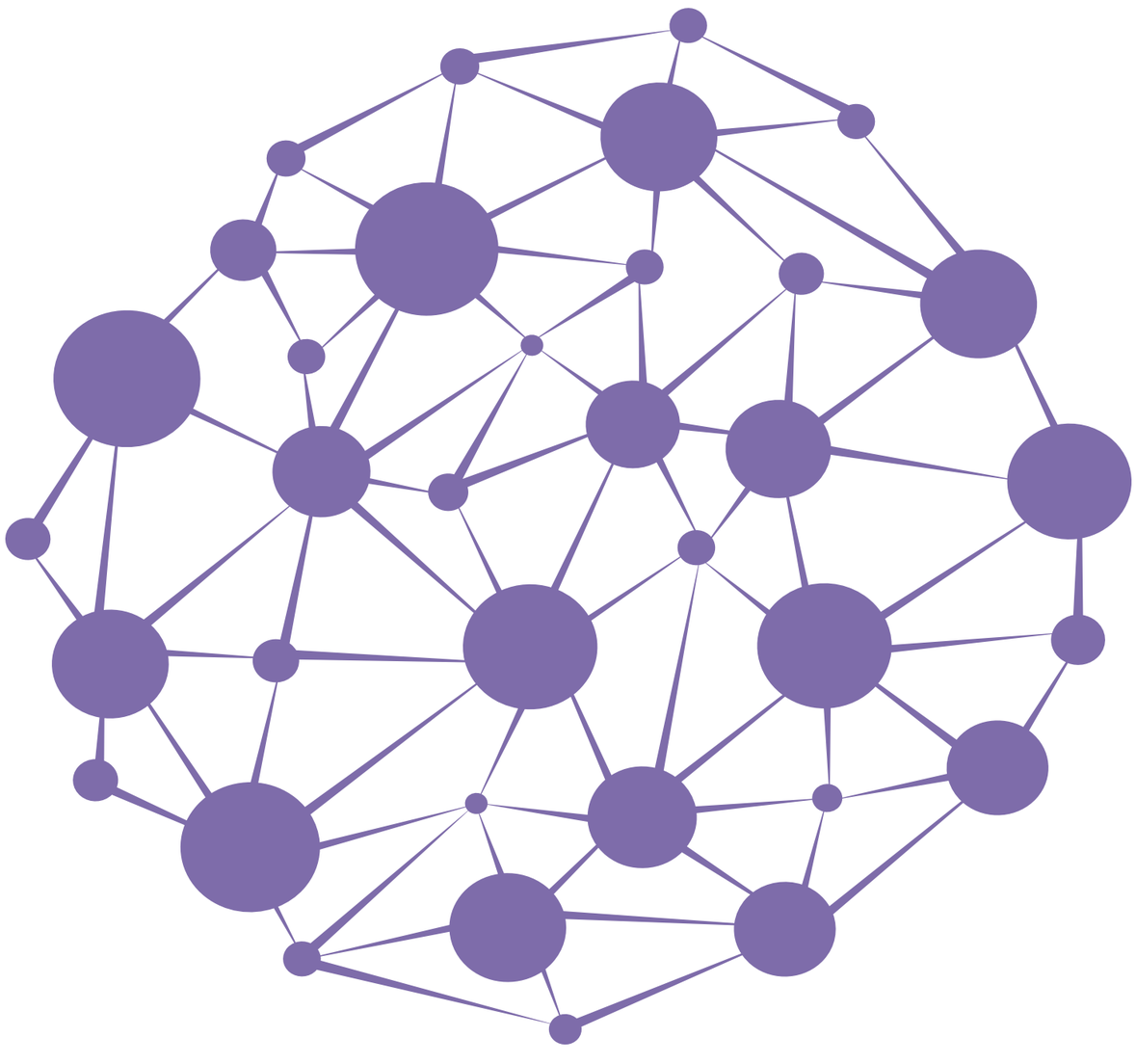
Collaboration Opportunities

- Industry-related teaching timelines i.e. what topics will be taught and when
- School excursions and incursions - teachers to advise on administration requirements and school policies e.g. lead times
- Career expo's
- Work experience programs
- Agri-tech related activities e.g. development, application/testing, data analysis and presenting results
- Producer engagement events
- Conferences

3.Support Networks

Agriculture is an extremely diverse and rapidly changing industry. This makes it hard for teachers to keep up with the latest information on current and emerging technologies. Furthermore, not all teachers have a background in agriculture, extensive networks or the opportunity to expose students to real-life experiences.
Establishing networks, both within and external to the teaching-industry partnership are beneficial, including an increase in knowledge, new sources of information and an awareness of existing teaching resources.

3.1 Identify existing networks	• Evaluate current networks, both professional and personal. Identify relationships that have potential to add-value to establishing a teacher-industry partnership. • Existing networks can offer support, expand knowledge and reflect on learning that can add value.
3.2 Maintain existing networks	• Relationships can be easily fostered when groups of like-minded people come together, so make an effort to maintain communication with your connections. • Being aware of 'friends of friends' also has added benefits, as they may have expansive networks that helps facilitate the spread of useful information.
3.3 Grow networks	• Start small by signing up to industry newsletters, education updates and information sessions, or participate in networking events, such as formal conferences, workshops and professional development events, which not only provide opportunities to grow knowledge but grow networks and sources of information and support.



4. Engaging students

Industry are often unaware of how to engage with students and what their level of understanding is when delivering information. While teachers have completed a university degree on how to communicate information to students, industry representatives may not. The following recommendations outline ways that industry representatives can upskill in effective student engagement:

4.1 Professional development	• Consider professional development opportunities to learn about delivering effective presentations and engaging with youth. • This may include informal opportunities such as webinars (e.g., creating a PowerPoint) or seeking advice from professionals, such as teachers or those experienced within the industry. • Formal opportunities could include face-to-face short courses or qualifications, such as certificates and diplomas to learn about teaching and learning theories.
4.2 Understand student capability	• Teachers are the best informed on the knowledge levels of their students. Consult with them about what the students have learnt previously and what level of background information they should understand. Ask the teacher for specific topic areas to cover and get their feedback on what you intend to present.
4.3 Evaluate student engagement and understanding	• When delivering to students, pay attention on how they are responding to the information you deliver, for example, do they seem engaged, confused, disinterested? Use their behavioural cues to identify if the information you are providing is appropriate, too technical or too simple. • The average attention span for students aged 11-15 is around 10-12 minutes, and they can retain 5-7 pieces of information at a time, so try to restrict lesson times or periods of constant talking to around 30 minutes and include brain breaks every 10-15 minutes. These breaks can be used to check in on what the students have learnt, for example, ask them to describe the information in their own words i.e. how a piece of technology works or how it sends data. Use their answers to praise their learning whilst re-iterating any gaps. • Allow time for interaction and discussion; this will ensure both students and industry get the most out of the learning session.
4.4 Consider interactive activities	• Students take on board information much better if they can experience it for themselves, rather than be given something to read or listen to. Develop learning material that has an interactive component where possible. For example, a crop sample to identify plant features, taste testing a product or a farm map to annotate during a tour. • Consider using software like Poll Everywhere to encourage two-way feedback.
4.5 Post-visit evaluation	• Gaining feedback from teachers and students after the lesson is the best way to assess how it went. Use this feedback to consider improvements or other ways to engage students next time.

5. School policies and procedures

There are certain policies and procedures that must be adhered to when external visitors engage with students. It may be helpful for industry representatives to be aware of these requirements when planning any activities that involve student interaction so they can plan to meet their obligations in advance. The following are a list of general requirements that schools have to consider when arranging for visitors to interact with students. Individual schools are responsible for developing their own policies and procedures, for both incursions and excursions, and may have additional or more specific requirements than those listed.

5.1 General	• The following procedures will generally be required by most schools in Australia (and are the responsibility of the teacher):
	  • Approval process e.g. principal, department lead
	  • Record keeping e.g. visitor dates, times, purpose
	  • Risk Assessments e.g. location, transport, children with special needs, site accessibility
	  • Approvals to work with children (can be obtained online)
	  • Resources required, including teachers time
	  • Legal requirements e.g. taking photos of students
	  • Parental consent e.g. signed permission forms

5.2 Incursions	• When delivering sessions to students at school the following procedures are generally required in addition to those listed in 5.1:
	  • Sign in and out procedures
	  • Visitor induction e.g. emergency procedures

5.3 Excursions	• When planning for students to attend an information session away from school, the following procedures are generally required in addition to those listed in 5.1:
	  • Transport e.g. method, cost
	  • Schools generally have a minimum 6-week timeframe to schedule excursions due to timetabling and administration requirements. Industry need to be aware that excursions generally cannot be scheduled in shorter timeframes and usually occur within school hours.
	  • It is recommended to discuss excursion possibilities as early as possible.

6. Teacher capability

Teachers do not always have a background in agriculture and/or technology, with many agri-tech devices and platforms requiring a basic understanding of data science and analysis. Teachers who don't have these skills should consider undertaking professional development activities. Teachers who develop a greater understanding and appreciation for agri-tech can facilitate effective engagement and implementation of technology at schools.

6.1 Adopt and share existing resources co-developed with industry	• Many teachers have previously engaged with industry to co-develop learning material for students and implemented these resources within their own classrooms. Acquiring tried-and-tested material has less pressure than developing the resource from scratch. • Some resources may need adapting for specific year levels and industries. Share these tried-and-tested materials with your networks. • Ensure that the creators are credited for their work.
6.2 Professional development	• Begin by gaining background information on the technology and/or industry, for example, watch YouTube clips or find resources on industry association webpages and social media sites. • Obtain information and advice from professionals or teachers who have completed similar training. They may suggest initial topics to start with to build a solid knowledge base. • Many agri-tech devices and platforms involve collecting and analysing data. It is recommended that teachers not familiar with these areas undertake targeted training in relevant software, such as Microsoft Excel or ArcGIS Online. These may be offered online as a webinar or tutorial, or through an approved training agency, such as enrolling in a university or TAFE unit. • Training opportunities that include both technology and associated analysis include short one-day sessions (STEM Food & Fibre PD's such as GPS Cows and Active Ewe), longer 2-3 day programs (Rabobank-CQU Teacher Farm Experience) and formal conferences (EvokeAg, CONASTA, Australian Farm Institute). Additionally, subscribe to educational newsletters advertising teacher PD activities.

6.3 Learn from local producers

- Engaging with producers helps provide context to agri-tech learning, whilst also creating valuable networks for teachers and students.
- Most producers realise the importance of educating students about food and fibre production and informing the future generation about career prospects. However, they are often unsure about how to initiate engagement with teachers or are too time poor to plan activities themselves.
- Teachers should approach local farmers and get to know them and their enterprise. This will provide an opportunity to learn about local industries and gain an appreciation for technology developments and applications with real-life context. Suggestions to initiate contact include talking to parents of the school who are farmers or have direct connections with farmers, approaching farmers selling produce at local markets, and asking service providers such as rural supplies stores to recommend farmers who may be interested in education activities.
- You may then choose to invite your new contact to present at school or ask whether your class can visit the farm.

Summary

The guidelines summarise key recommendations that contribute to establishing effective teacher-industry partnerships. Each partnership is unique, from the technology, to the industry to the school. These guidelines have been designed to include features that are common to teacher-industry relationships, however, it is not a comprehensive list and additional factors specific to individuals and partnerships will need to be to be discussed to develop an effective functional relationship.

The recommendations were derived by interviewing teachers and industry representatives who had recently established partnerships to co-develop learning material for the 'Women in Agri-tech' program. They aim to provide partners with discussion points that may have been overlooked or not considered during the initial stages of establishing a partnership.

The benefits achieved from effective teacher-industry partnerships are far reaching, with the ultimate shared goal of empowering students with knowledge of current and emerging agri-tech and food and fibre production in general. Ultimately, this will ensure the successful growth of the agricultural industry for generations to come by attracting a passionate and knowledgeable workforce.

Participants of the 2019 Women in Agri-tech program