

Optimized Training - Innovative Methods and tools for Acceptance of prior Learning in qualifications and workplace training

Output 7: Instructor training materials and methods development for use by teachers and trainers from VET schools and supply and fish production companies

“Tested and evaluated learning materials and new methods for recognition of previous learning”

Authors: Martyn H. Haines², John B. Stav¹ and Dag Willmann³

¹ NTNU/BKS

² Pisces Learning Innovations Ltd. (United Kingdom)

³ Guri Kunna VET school (Norway)

Version: Final

Date: 01.10.2019



Funded by the
Erasmus+ Programme
of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein.

Executive summary

The importance of teacher training to develop positive attitudes within aquaculture VET teaching teams towards VET innovation in general and the 'Recognition and Accreditation' (RPL/APL) in particular, as well as the necessary pedagogy and skills, is outlined.

The staff development journey is described in the context of the methods, tools and pedagogy piloted and refined at the VET institutions Guri Kunna in mid-Norway and Inverness College in Scotland.

The specific guidance on the application of the different Response Tools (RT) applied in each country are appended, including the One2Act Eval system transferred from NTNU in Norway and Socrative, a freely available software that can be accessed from the Internet. In addition, detailed guidance is provided on the development of reliable and effective multiple-choice questions, sitting at the heart of RPL and APL processes applied within each country.

The importance and influence of learner feedback at every stage of the development of RPL/APL methodology and the involvement and development of teaching staff is highlighted, culminating in some guidelines to RPL/APL adoption by VET institutions.

Table of Contents

Executive summary	2
1. Teacher Training	Feil! Bokmerke er ikke definert.
1.1 Scottish overview (Inverness College)	4
1.2 Norwegian overview (Gurri Kunna).....	4
2. Evaluation and refinement	5
2.1 Learners initial feedback.....	5
2.2 Evaluation of methods, tools and resources	8
3. Guidelines to VET providers for RPL/APL	13
3.1 Classroom based RPL	13
3.2 Work-based RPL and APL.....	15
4. Conclusions and recommendations	17
 Appendix 1: Introduction to Socrative.....	 18
Appendix 2: Guide to creating multiple choice questions	40
Appendix 3: Introduction to Onve2Act Eval.....	71

1. Teacher training

The Optimal project provided the teaching staff in two institutions, one Scottish and the other Norwegian, the opportunity to develop and pilot innovative VET delivery approaches, namely, the application of 'Recognition and Accreditation of Prior Learning' (RPL/APL) supported by Response Technology (RT). Although great care was taken to ensure that this was not a disruptive departure from current VET practices in either institution, it did represent a significant change. As such, there was a danger that Optimal could be perceived by teachers as 'more work for no real benefit or gain' or even an undesirable threat to the status quo.

Consequently, the introduction of innovative VET within Optimal was also a test of leadership and management for those responsible for the teaching teams involved. There were many 'change management' aspects to consider, including the perceived (and actual) effectiveness of current methods of VET delivery and the receptiveness of teaching staff to new pedagogy and learning technologies. Attitudes towards innovation and change must always be fully addressed before any real progress can be made to encourage the early adopters to emerge and provide a nucleus of receptive 'advocates for innovation' from within the teaching staff.

There are examples of both good 'change management' practices and neglectful management, from which valuable lessons were drawn for discussion by the partners, when considering VET innovation in their respective organisations. Above all, it was recognised that senior management leadership and commitment and the support provided to teaching staff is often 'mission critical'. It was noticeable that, as well as providing a new pedagogy and skills, training increased the teaching team's engagement and developed positive attitudes towards VET innovation that will have positive ramifications beyond the lifetime of the project.

1.1 Scottish overview (Inverness College)

Inverness College is part of the University of the Highlands and Islands (UHI) consortium, who have a strong track record regarding VET innovation as their curriculum needs to reach learners across a vast rural landscape. In keeping with the UHI mission to reach out to learners, the Aquaculture MA delivery team has applied distance learning methods to their delivery in the past. For many years paper-based aquaculture learning packs were deployed to complement their farm-based delivery system, but these have gradually fallen into disuse. More recently, MA learners were being provided a list of internet-based reference sources for them to refer to as they compiled paper based 'portfolios of assessment evidence', heavily informed by practices on their farm

The staff were becoming increasingly aware of how much time learners were having to spend on a paper-based assessment process, referred to as 'portfolio development', as the sole strategy for assessing underpinning knowledge. This is paralleled by the observation of naturally occurring practical farm activities by farm supervisors, leading to 'witness testimonies', integral to the assessment of practical competence. Consequently, the teaching team were receptive to considering changes to their assessment practices, but the time needed to make those changes had been hard to protect.

It was clear to Inverness College teachers that RPL/APL approaches offered by Optimal could compliment the Aquaculture MA work-based delivery system in Scotland. However, the requirement for the Optimal pilot to act as a 'proof of concept' led to an extensive negotiation with the teaching staff and departmental manager. Ultimately, their confidence and trust in the long-term value of RPL and APL to their delivery system was gained. Subsequently, the staff development and guidance

materials on the use of the Socrative RT and the development of multiple-choice questions provided important support within the process in Scotland (see appendices 1 and 2).

1.2 Norwegian overview (Guri-Kunna)

The introduction of new VET pedagogy and the associated learning technologies has been problematic in the past, with new Virtual Learning Environments (VLEs) imposed by Norwegian Education Authorities with inadequate staff preparation. In many institutions VLE changes are circumvented by the more progressive innovators within the teaching staff. Pioneering 'individualists' hyperlink their own resources to any new VLE platform the authorities introduce with minimal disruption to their teaching. Allegedly, there are many more staff who simply do not engage with technology unless compelled to by their institution leader and carry on with their traditional teaching methods.

Conversely, despite the systemic challenges above, Guri Kunna started to embrace VET innovation several years ago, as a solution to managing large mixed ability groups of learners more effectively. An early positive experience with VET innovation by an early adopter of Response Technology (RT) transferred from NTNU, catalysed the Optimal project, providing more staff the opportunity to innovate and develop their classroom-based teaching practices through RPL and RT applications.

As the project progressed, wider innovative VET concepts were introduced. The process of computer-based learning and 'instructional design' was introduced, leading to the development of a new digital learning object the 'interactive fish' by PLI at Guri Kunn's request, utilising the high-quality digital fish anatomy images they provided. This was followed by an analysis of the Norwegian NQ to derive more specific learning outcomes (LOs). Once agreed, these LOs informed the development of multiple-choice questions by PLI for Guri Kunna to use during pre-testing, prior to the start of each new subject to establish the range of prior knowledge in the group. Thereafter, the One2Act Eval tool was used before the start of a new topic and during many of the classes, to enhance course delivery and the engagement of learners.

This considerable staff development journey for those involved is more fully revealed in section 2 below.

2. Evaluation and refinement

Teaching staff evaluation of the Optimal RPL/APL practices proposed, including; the RPL/APL concept and benefits, the application of multiple-choice questions through RT and the integration with other forms of learning, was of fundamental importance to their engagement. The confidence of staff and belief in the benefits of innovation had to be built gradually and patiently.

2.1 Learners initial feedback

The initial feedback from learners was fundamental to building teaching staff confidence and a strong negative reaction would have been a considerable setback for Optimal. Fortunately, this did not occur.

2.1.1 Scotland – Inverness College

A group of 5 Aquaculture MA learners undergoing their induction following initial recruitment were exposed to the Socrative RT, using it to answer a sample of simple multiple-choice questions on fish

anatomy. This was undertaken during individual tutorial visits by the Inverness College MA programme leader.

The aim was to assess the;

- learners' response to the technology (Socrative RT) and its user friendliness, and
- their reaction to the inclusion of multiple choice delivered by RT within their MA program's assessment strategy.

The results of this initial evaluation were positive, with learners enjoying the RT experience and feeling comfortable with the use of their hand-held devices (mobile phones) for the purpose of undertaking multiple-choice assessment.

There was one very insightful comment made by one learner, who thought the idea was generally a good one. Quote: "It depends on how the information is used after it has been gathered, whether or not this is really adding value to the program". This comment resonated strongly with the original philosophy and advice Scottish partners received based on the Norwegian experience regarding RPL and data collection. If learners do not see point and purpose through visible follow up and use of the information by teachers, they will quickly become demotivated.

The MA program leader was generally encouraged and based on this experience PLI were able to fully detail how RPL and APL could be applied to the delivery of a centrally important part of the MA program, 'Nutrition and Growth'

2.1.2 Norway Guri-Kunna

Response tools were introduced to the teachers from the aquaculture team during the early stages, building their skills and confidence incrementally and allowing them to apply the tool in several ways during the Optimal project. They were provided staff development by the BKS lead partner, exemplifying each of the approaches outlined below, in order to overcome any reticence with using the response technology and build their confidence. They were provided technical support throughout the Optimal pilot during their use of RT within classes.

The Guri Kunna teachers were introduced to the technology and supported by BKS before and throughout the pilot, starting with the preparation and operation of the technology. Before using a response tool for the first time in class, practical pre-requisites must be addressed.

The teachers were made aware of the technical principles and checks essential to reliable application of the response system (one2act eval):

- The 'one2act eval' software must be installed on the teachers computer in the classroom where the system is used. If they lack administrator access to the classroom computer the software can be installed on a laptop, brought to the classroom. The system may also be run from a memory stick.
- The computer that's running the response tool software must be connected to a video projector for learners to be able to see the result graphs following a vote.
- The wireless network where the system is used must have sufficient capacity. Response tools normally generate limited data traffic, but the critical factor is whether the wireless access points can cope with a sufficient number of simultaneous connections that sends and receive

responses during a short period of time. It must be noted that the same learner can have multiple devices online simultaneously.

- Learners need to be informed in advance of their first use of response tools and provided information about the purpose of the system, and practical instruction in their use.

The staff development process started by clarifying and demonstrating the above practicalities so as teachers could ensure that the RT interface was ready for use, and that learners were able to recall the vote page to vote. Then teachers were shown how to create a reliable environment for RT application by;

- logging on to the interface and create a session code, and
- assisting learners to log on and enter the session code (Note: This should happen quickly, if the learners have saved log on page as a shortcut on their mobile device)

Once teachers were confident with the technology, some inspirational concrete examples were offered at the outset to show how response tools could be used by VET practitioners to assist teaching and learning.

Example 1 – **Supporting mainstream education**

The response tool can be used in mainstream education to evaluate whether learners have understood a given concept, rationale, or reasoning. Questions can be asked in order to monitor and evaluate any mainstream learning activity to evaluate its efficacy. This approach is illustrated below:



The teacher ask a question



The students answers with their devices



The results being displayed and discussed

After the question has been asked and the voting has finished, is up to the teacher to decide their next course of action. However, it is important that the responses from the learners are properly evaluated and this can involve the learners themselves. The summary provided by the teacher is very important to the learners' learning experience and if it is meaningful will demonstrates the value of the time spent cooperating with RT to the learners.

Example 2: **Digital blackboards**

Application of response tools integrated with digital blackboards can help to streamline RPL applications, making the process more 'user friendly for teachers and learners.



The teachers control of the response tool interface from a digital board is designed for ease of operation. All the buttons are large enough to be easily tapped, and all functions require just a few taps. However, a digital board is not essential to response tool applications, but it is a useful tool to help the teacher in 'telling a story' and give the best possible flow to the teaching.

With access to a digital whiteboard integrated with RT, the communication from teacher to class can all take place from in front of the board. There is no need to move from the whiteboard to the computer each time you run a vote proving a much easier environment for teacher and learners.

2.2 Evaluation of methods tools and resources

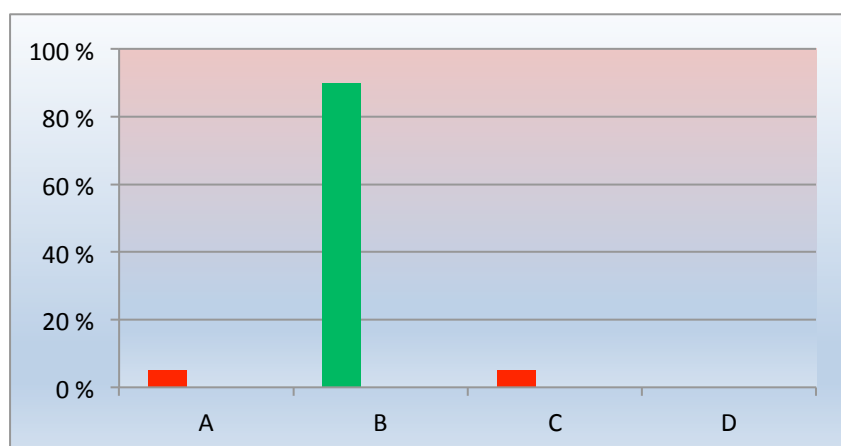
1.2.1 Norway

The methodology for giving feedback to the class after gathering data with a response system, involves several aspects. How teachers choose to review a question when a vote is completed, typically depends on the responses;

- the percentage of correct and incorrect responses,
- and how responses are distributed.

In order to develop their understanding of RT data interpretation, the teachers were provided a series of scenarios to consider and encouraged to think how they could respond to each to improve teaching and learning.

Scenario 1: Most of the class answer the question correctly

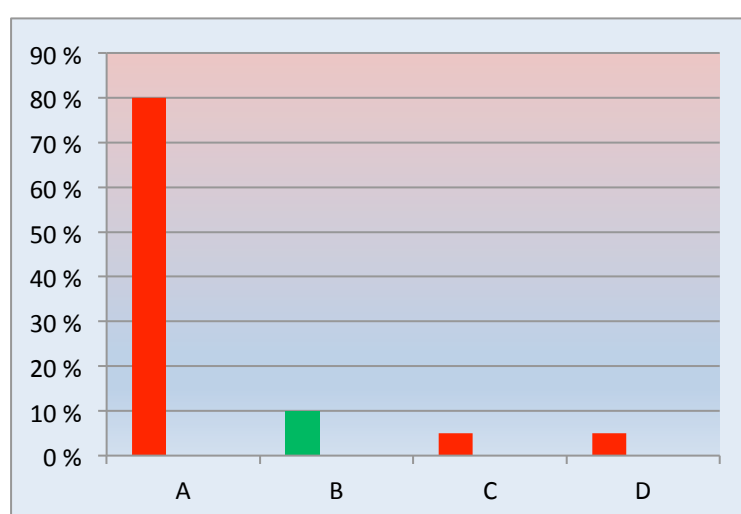


When a large percentage have answered correctly (approximately 90%), a brief verification that most learners have answered correctly is all that is needed:

"Since most of you have answered correctly, green option B was right, and this is right because of, while the options are wrong because of"

The handling of this scenario within the classroom by teachers is straight forward and helps to build their confidence in RT applications.

Scenario 2: Most of the class fails to answer correctly



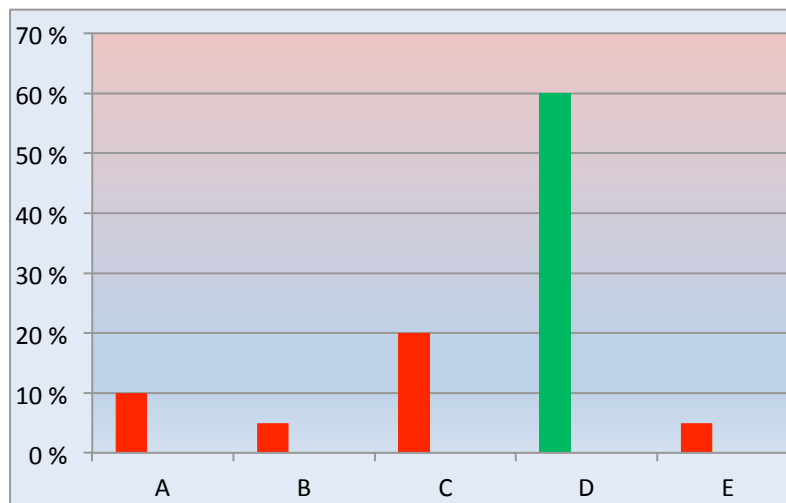
In such cases, where the vast majority of learners answer incorrectly, it requires the intervention of the teacher in the form of a thorough review with in-dept explanations. There are options as to how this is handles by the teacher. Before such a review is given, they might try to encourage learners to discuss;

- why so many answered incorrectly,
- whether they experienced the task or problem as particularly difficult or unclearly formulated,
- whether the learners felt that the presentation of the question in advance was sufficient,
- whether it was an important concept or idea that many had misunderstood,
- or whether there were other things that led to so many incorrect responses.

Scenario 3: "30-70%" of the learners answer correctly

If the number of correct answers fall between 30-70%, this is an ideal starting point for establishing a group discussion followed by a second vote, without revealing the correct answers, which will be displayed at the end. Such a distribution of responses indicates that a significant proportion of the learners have understood the problem. The goal of the discussion should be that the learners who

have understood the problem explain to those who misunderstood. The process of explanation may also help to further their learning.



Such a session may progress as follows:

1. Teacher presents question
2. Learners will receive an individual pause of approximately 1-2 minutes without any discussion. This is the individual thinking period.
3. Learners vote.
4. The distribution of answers come up with a percentage of correct answers in the range of 30-70%.
5. Without revealing the correct answer, the learners are asked to discuss the problem with their neighbors or in groups, where individuals can argue their case.
6. A new learners vote.
7. The teacher summarises and consolidates all key learning points.

Scenario 4. Peer learning adapted training

"Peer instruction" is a response system methodology originally developed by physics professor Eric Mazur at Harvard University. As the name indicates, this is a methodology that envisage that pupils / learners will have the opportunity to instruct one another ("fellow learner/peer" in this context). When using this methodology, reconciliation occurs over two rounds - the first vote after a short break, and then a new vote after a group discussion.

To follow up a response tool question with "peer learning activities" progresses as follows:

1. The teacher presents the question.
2. The learners are provided up to 1-2 minutes individual thinking time.
3. The teacher runs a vote, and the learners vote. (The teacher must *be sure to turn off the automatic display of the result graphs before starting the vote, because the displaying of graphs will influence the discussion afterwards*)

4. The teacher then let the learners start a peer learning based group discussion, which can last 2-3 minutes.
5. The teacher runs a new vote, and the learners vote again. *Here the result graphs are allowed to come up automatically, activated by the teacher before voting begins. Performance graphs can also be viewed before and after the discussion, to demonstrate its efficacy.*
6. Teacher sums up, ensuring the summary reflects how the learners responded.

The purpose of the individual “thinking pause” at the very start, is that each learner will make up an independent opinion on what is the correct answer, and why. This way they will be better prepared when the discussion starts and learners will be less likely to be "overrun" by the dominant fellow learners with divergent views on what is the correct answer.

This series of scenarios from 1 to 4 is increasingly challenging for the teachers, and in practice the Gurri Kunna teachers built their skills and confidence, incrementally. The assistance of the course organiser who attended all classes and operated the RT on behalf of the teachers, was a major assistance to teacher development. This allowed them to focus more on the teaching and learning initially, without being distracted or concerned by the technology itself.

Kåre Rømuld - Guri Kunna aquaculture lecturer personal journey:



Kåre Rømuld, the teacher on the left, teaches aquaculture at Guri Kunna VET School in Norway. Kåre used the response tools in vocational courses, delivered to the aquaculture industry as well as in upper secondary education for younger learners. Both learner groups have the goal of qualifying for an Nationally Qualification (NQ) certificate in Aquaculture. He discovered that using response tools was particularly valuable in the courses provided to industry (within the Optimal pilot) as these learners get considerably less time in class than the young learners. He found that it was important to optimize and streamline classes through the following process which he repeated and refined throughout the Optimal pilot:

Before the course started, learners from the industry received a link to a pre-test that will be answered by the learners prior to the course (composed of 16 attendance based classes with 50 students) starting. This was a quick evaluation where answers were given by using smart phones, tablets or computers, depending on what the learners prefer to use.

The answers from the learners allowed Kåre to decide which parts of the curriculum he needed to focus on and emphasise in the course and which parts needed less attention due to the knowledge gaps or misunderstanding that had occurred while working in a fish farming company. He used this information to finalize and the course plan for the entire course (all 16 sessions).

He then repeated this process before each new module in the course plan commences, in order to determine in more detail which parts of the module curriculum to focus on and emphasise in the

next class. The learners had 2-3 days to provide their responses. It is enough for approximately 2 out of 3 to provide a reply in order to estimate the situation in the class. The questions were introduced by first asking if they thought they had a good understanding and overview of a specific subject. When they have given this feedback, they were sent a specific subject question to answer. If they had the knowledge and competence, they could answer correctly. Frequently the teacher observed a gap between the learners self-declared knowledge and their actual knowledge.

In addition to these pre-tests, Kåre also uses response tools to promote engagement, interaction and discussion between learners during the lectures, by conducting small quizzes during each session. Learners reply by using a learner response system. This helps him to check if the learners have understood what he has taught during the lecture. This may be a prepared quiz, but a learner seeking to address a challenging task or problem by asking a specific question can also initiate the process. Kåre then repeats this question to the class, giving them 3 alternative solutions to vote on. In this way the learners question is smoothly included into the training session, without destroying the story and flow that he is developing for the learners.

At the end of the module or towards the end of the course, Kåre repeated the upfront pre-tests to document the learning progression.

2.2.2 Scotland

Throughout the Scottish Optimal pilot, informal and formal feedback was gathered from learners using systematic surveys which learners were asked to complete. Regular review meetings were held with the Inverness College teaching team and their evaluation of the benefits and challenges of RPL and APL were fully considered. (See Output 8 Report)

This enabled close alignment between RPL and APL within their MA assessment strategy to ensure the Optimal pilot added value to the MA program and in no way disrupted the assessment or learning process. This is exemplified by the development of multiple-choice assessment for small boats. Some of the MA knowledge evidence requirements could be assessed through multiple choice as the use of 'concrete questions' to establish the learners' knowledge of boats, knots and navigation were clearly defined and applicable to all farms. However, other assessment evidence requirements specified in the MA had to be delivered in the context of the farm on which the learner was based, and did not lend themselves to multiple choice, necessitating a 'blended' approach.

The staff were consulted and listened to at all stages. They were developed and supported throughout the process, alongside resource development, according to the needs of Optimal and their MA program, as agreed at the outset. (See output 6 report). All RPL/APL methods, tools and approaches were kept under constant scrutiny, leading to a future model for RPL and APL within the delivery of work-based Aquaculture MA.

3. Guidelines to RPL/APL adoption by VET providers

Based on the experience gained by Guri Kunna (Norway) and Inverness College (Scotland) within Optimal, guidelines have been produced for VET organisations considering the adoption of RPL/APL approaches. They are not intended to be comprehensive or prescriptive, as the VET regulatory system, and existing staff skill sets, experience and attitudes towards VET innovation and learning technologies, will all have some bearing on the approach chosen by any VET institution.

3.1 Application of RPL in Norway

RPL was applied inside and outside of the classroom during the training courses in Norway. They were applied during work and more commonly after the working day had been completed.

The quality of the questions asked are very important when using response tools. If learners are experiencing issues as thoughtful, relevant and stimulating, experience indicates that the learners will be positive regarding the use of a response tool in vocational education and training. Unprepared or unthoughtful questions that appear irrelevant to learners and do not contribute to their learning, can lead to the RT and RPL being dismissed as a waste of time.

The challenge with making up high quality multiple-choice questions is not related specifically to the technology.

Guidelines for creating good multiple choices questions:

- Have a clear understanding of what type of questions you want to ask - factual questions, conceptual questions, and questions preparing for discussions in groups (peer learning) or in class
- Make sure to take ownership of the problem or case. If you "borrow" questions from other sources (textbooks or Internet etc.), be sure to transform it into "your" language. If learners feel that the teacher has "stolen" questions from other sources without having any ownership of the issue and investing time in offering high quality teaching to their class, there is a risk of that the class may interpret this as a lack of commitment from the teacher. Why should the learners then invest time in providing feedback to the teacher?
- Avoid to ambiguous language in a question. A question may be challenging and difficult, but not because it is unclear. Questions may be delivered orally to the class if they only have 2 or 3 alternatives.
- Prepare a detailed explanation after every question.
- Whatever the learning activities that follows the usage of response tools (teacher led explanation, peer learning, discussions etc.), it is important that the teacher forms a well-rounded conclusion. It is the teacher's explanation that is the factor that affects and contributes most to the learners' experience of learning. The teacher is seen as the expert by the learners.

The question should be neither too easy, nor too difficult. They should be organized by starting with a concrete question set early in the course, moving towards conceptual question set towards the

end. Questions considered to be too trivial will not motivate and engage learners to take part in voting's and the process won't lead to learning. The time will not be perceived to be well spent. The same conclusion will be drawn by learners if the tasks or problems are perceived as too challenging or too difficult. Thus, the questions must be designed and organized in such a way that the group/class are a little challenged.

A general principle for evaluating whether a task or problem is good or bad, can be based on the following:

- If more than 70% of the class answer correctly the question may be too easy, making it difficult to initiate discussions in the class or in groups
- If fewer than 30% answer correctly the question may be too difficult and it will be challenging to set up a discussion in the class or in groups.

Therefore, it is recommended to operate within the a "30-70%" range in order to enhance the discussions that support the learning process through peer learning activities. Just how effective a question is will depend on the level of the learners. It should be noted that a question that works well in one class (e.g. a strong class with a majority of experienced learners) might not work well in another class, since the classes may be at a different level and/or with a different 'prior learning' profile.

Can I introduce a problem or ask a question without showing the learners the options?

Response tools may be used to stimulate interaction and discussion in the classroom. Multiple-choice questions of course have some limitations. For example, a question, when asked in multiple-choice form, could make a discussion less open and more focused on the alternatives itself, instead of addressing the problem itself. One-way to avoid the limitations of multiple-choice questions, is to present the task or problem without showing the options first.

Almost all multiple-choice questions can be presented to the class without showing any alternatives. Here is an example:

"Your boss raises money for what he believes is a charitable cause, in good faith. You suspect, however, that your boss has been deceived, and that it is all about fraud. What do you do?"

After presenting the question, the learners must get a chance to think and discuss in small groups. The alternatives may be presented just before the voting takes place:

- A. *I ask my colleagues not to give money to this cause*
- B. *I report my suspicions to my chief supervisor*
- C. *I investigate*
- D. *I tell the boss about my suspicions*
- E. *I do nothing*
- F. *None of the above*

To avoid displaying the options when the problem is presented may be used for knowledge-oriented questions too. The method may be particularly interesting and suitable for open and impartial discussion.

Suggestions for further reading on design of multiple-choice tests:

To make good multiple-choice tests requires experience, and many books have been written about the subject. We can recommend this book:

Thomas M. Haladyna: Developing and validating multiple-choice test items (2004), This English-language book provides a very thorough introduction in how to formulate multiple-choice questions.

In addition, see appendix 2, which provides further detailed guidance on the creation of multiple-choice questions.

The partners within the Optimal project have also developed technical support guidance which has been used during the development of teachers in both Norway and Scotland. Appendix 1 provides detailed guidelines on the application of Socrative as used within the Optimal pilot at Inverness College (Scotland) and Appendix 3 provides more detailed guidelines on the application of 'one2actEval' used by Guri Kunna in Mid Norway.

3.2 Work-based RPL/APL

In Scotland the adoption process started with discussions between PLI and teaching staff at Inverness College regarding the RPL and APL concept. The difference between RPL and APL was discussed at length, to ensure both were fully understood, before exploring how they might be applied to benefit the work-based Aquaculture MA delivery. (The RPL/APL definitions and distinctions are defined more fully in the O6 report)

The staff were receptive to both RPL and APL and the addition of technology-based learning to enhance the MA. There was a good fit with their more general desire to reduce the MA assessment burden for learners and staff, as it had evolved into a 'farm specific paper-based portfolio' system that appeared onerous for some learners. It had been observed that as many as 50% of potential Inverness College MA recruits did not return after the initial induction, once the paper-based portfolio process had been revealed and perceived as particularly challenging, especially to those with learning difficulties. This realisation and the potential for gaining time efficiencies, provided teachers a significant incentive for changing the MA assessment strategy and pedagogy, 'spearheaded' by automation through multiple choice and Response Technology (RT).

When introducing changes to pedagogy, teaching staff involvement in all stages of planning and preparation, parallel to personal skills development, proved to be most important. The following guidance has been derived from both positive and negative experiences gained within Optimal in Scotland from a staff perspective.

Stages of RPL/APL adoption within a work-based NQ:

- a) *Evaluation of the assessment requirements relating to knowledge and understanding defined within the NQ.*

This led to identification of opportunities for the use of multiple choice within the Aquaculture MA assessment strategy. The analysis allowed existing multiple-choice questions (previously developed for Norway) to be aligned, and/or new questions developed, to meet knowledge evidence requirements, creating pathways to APL, following internal verification of the question sets. (See c below)

b) The selection of RT following the evaluation of alternative systems (functionality and user friendliness)

The choice of Socrative as the RT was made by PLI in consultation with the Inverness College teaching staff to ensure a good fit with their educational policies and technical support available. Other systems were reviewed, and meetings held with Socrative users, including Scotland's Rural College (SRUC). They were sufficiently encouraging to recommend the Socrative RT for the Optimal pilot.

Thereafter, staff development was provided to the Inverness teachers on Socrative applications by PLI, supported by the guidelines developed and appended (See Appendix 1)

c) The development of multiple-choice questions

The concrete multiple-choice questions developed for Guri Kunna to pilot in the first instance, were mapped to the Aquaculture MA. Question banks were then presented to Inverness College for internal approval, leading to discussion and some revision. However, although familiar with multiple choice assessment, the teaching staff were not involved in the origination of question sets which is a disadvantage best avoided.

The development of good multiple-choice questions to meet defined standards for the assessment of underpinning knowledge, is a high-level skill that requires staff development followed by considerable practice and refinement. It is a team effort and the feedback from other experienced VET practitioners, both subject experts and those with experience in multiple choice questioning is essential.

Guidelines to multiple choice question development are provided in Appendix 2.

d) The development of learning materials

The learning materials were developed and mapped to the multiple-choice questions by PLI, using a coding system to ensure the inventory of digital assets could be properly managed and controlled. This enabled the teaching staff to present learners with the appropriate set of discrete 'learning episodes' according to their initial RPL multiple choice results.

The teaching staff were not involved in the development of the original learning episodes, but were involved in providing feedback on them, some of which led to refinements before use, as part of the quality assurance process and to ensure that they satisfied their interpretation of the MA standards.

It is essential teaching staff are involved in the quality assurance of learning materials and desirable, although not essential that they are involved in their development.

4. Conclusions and recommendations

In both countries winning the 'hearts and minds' of the teachers developing the use of RPL supported by RT within their VET programmes was fundamental to success. The continual support provided to teachers in both countries to swiftly resolve any difficulties and issues and to build confidence were key ingredients.

Initially teachers needed to see and believe that the technology itself is user friendly and reliable for themselves and their learners, which led multiple demonstrations and carefully testing with learners. If the technology fails them and their learners during the early stages, teachers are often under too much work pressure to give many 'second chances'.

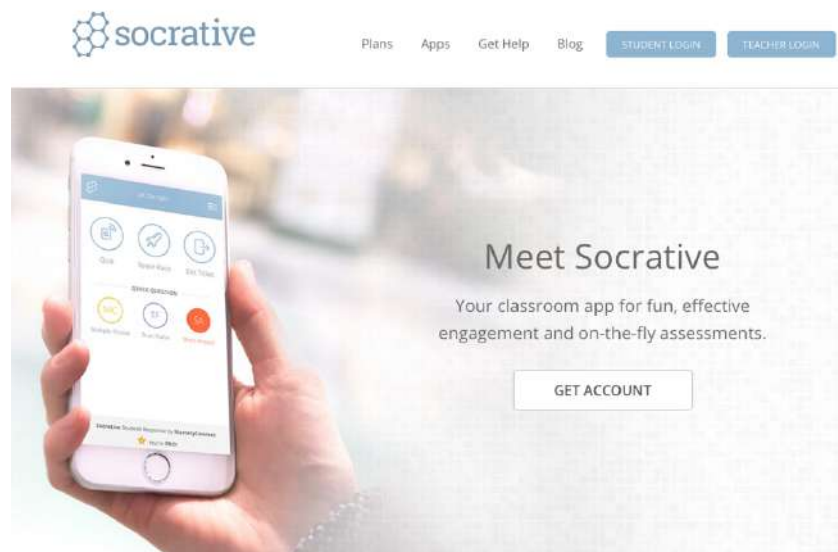
In every teaching establishment there are a minority of innovative teachers who are crucial to changing teaching practices. They normally have a progressive mentality that welcomes new practices, once they can clearly see the benefits. By getting them started and by supporting them comprehensively, these early advocates can create a 'me too' mentality within the staff, once the new methods and their benefits become a part of the staff room chat, as they inevitably will.

From that point on the battle is won and changes to pedagogy can progress incrementally, fuelled by the enthusiasm of the teachers themselves.

The experience of the teachers in both Norway and Scotland was positive and one of the legacies of the Optimal project will be their continued use and development of RPL and the application of suitable technologies to support it. For Guri Kunna, the One2Act Eval and iLike response technology worked well and are ideal for supporting a classroom based pedagogy, whereas in Scotland it was less than ideal and Inverness College will transition to the use of e-portfolio and virtual learning environments when further developing RPL and APL for their MA Aquaculture learners.

Appendix 1

Introduction to Socrative



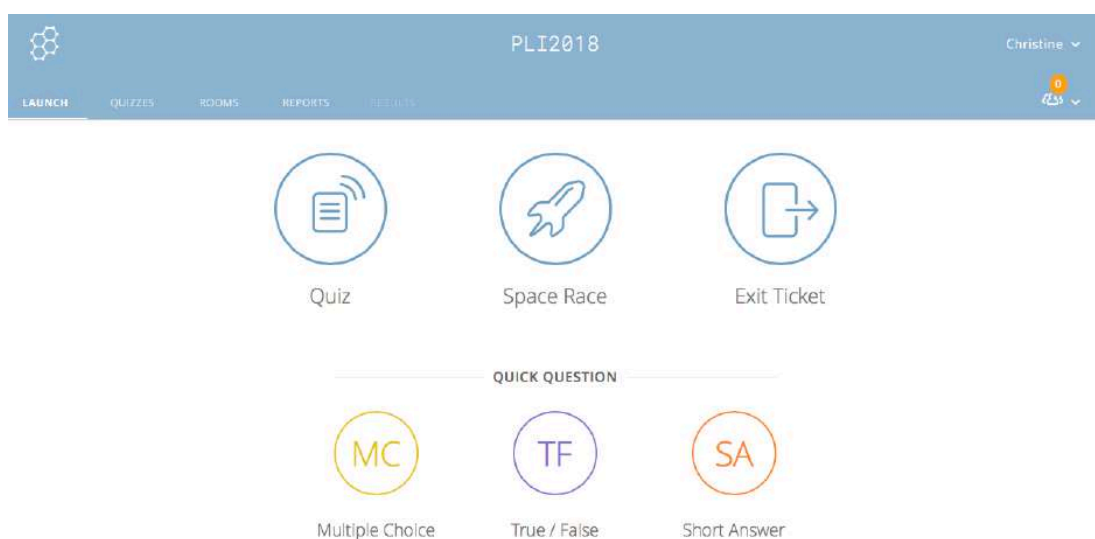
Socrative describes itself as a 'classroom app for fun, effective engagement and on-the-fly assessments.' It can be used either in the classroom or with learners who are learning remotely. It works on computers, laptops, tablets and phones.

The free version allows you to have one public 'room' (where your learners will enter to take the 'assessments/quizzes') and up to 50 learners per session. Learners can come in to the 'room' when they are given the name of that room. You can change the name of your room as often as you like. They cannot do anything unless you have launched an activity.

A brief introduction to Socrative is found at <https://www.socrative.com>

From here you, the teacher, can create your account.

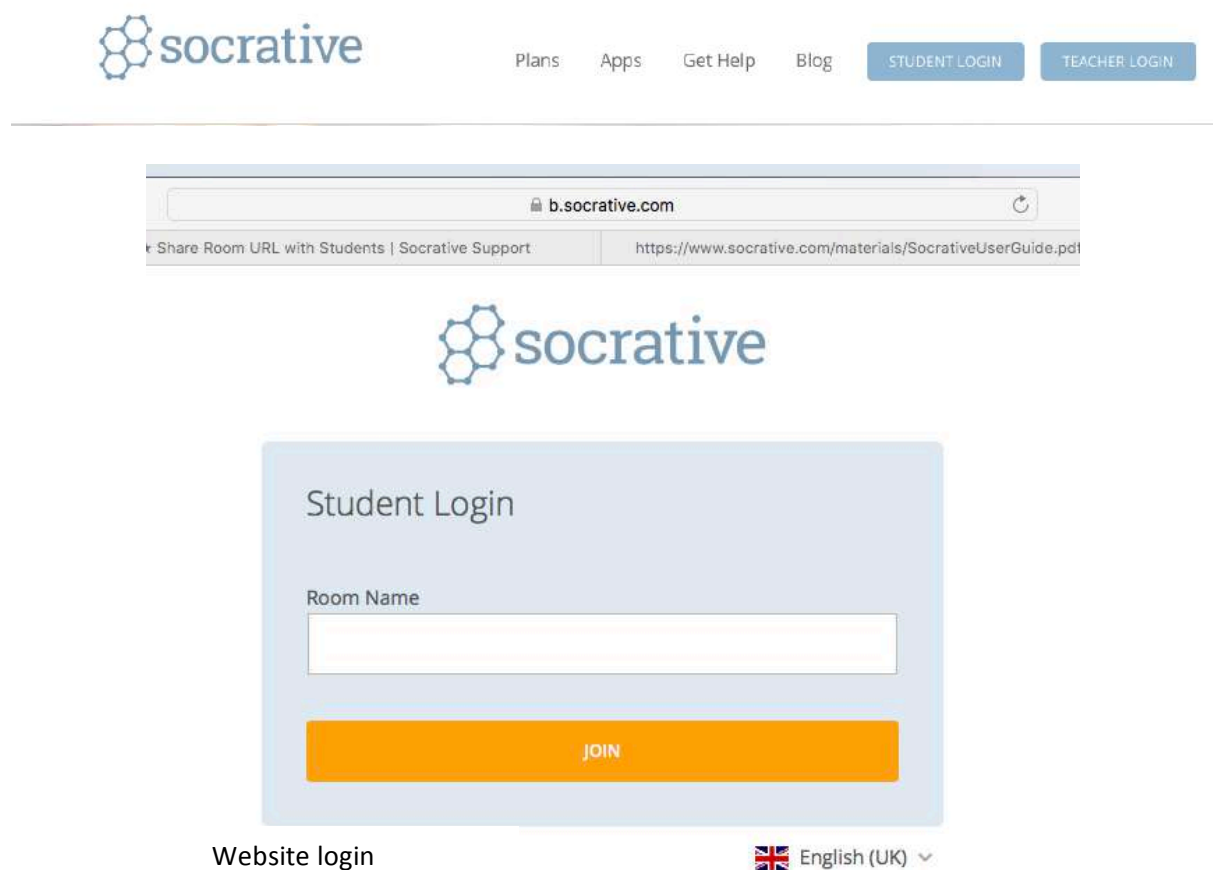
You can also log in to your teacher account from this page.



Account Launch page

All your Socrative quizzes and questions are stored online at <https://b.socrative.com>. So they can be accessed by you and your learners from anywhere there is an internet connection.

Learner interface



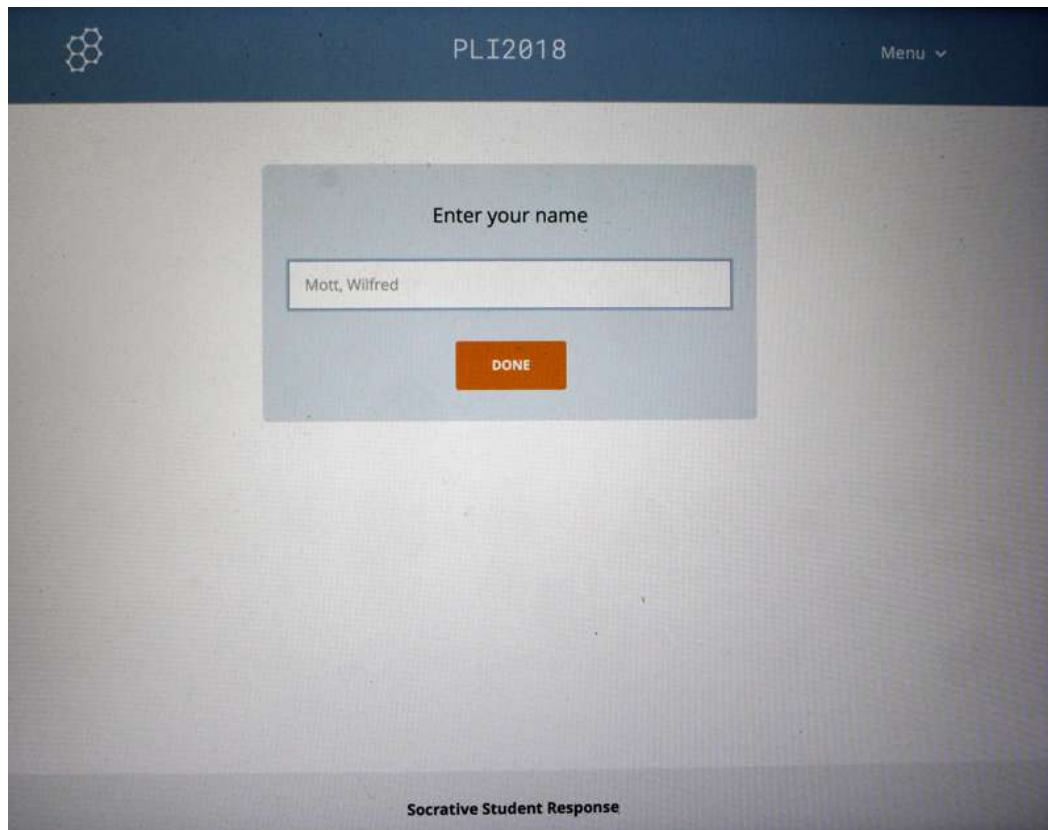
The screenshot shows the Socrative website's learner interface. At the top, there is a navigation bar with the Socrative logo, links for 'Plans', 'Apps', 'Get Help', and 'Blog', and two buttons: 'STUDENT LOGIN' and 'TEACHER LOGIN'. Below the navigation bar, a browser window is shown with the address bar displaying 'b.socrative.com'. The main content area features the Socrative logo and a 'Student Login' form. The form has a 'Room Name' label above a text input field, and a large orange 'JOIN' button below it. At the bottom of the page, there is a language selector showing 'English (UK)' with a dropdown arrow.

Your learners can access the quizzes through the Socrative website <https://www.socrative.com>. This takes them to the Login page at <https://b.socrative.com>.

Or they can access the quizzes through the Socrative app on a phone or tablet. The interface and login are exactly the same. The quizzes display in the same way too. Zoom for images is not effective on a phone.

No email addresses are required to take part in quizzes. You can ask for their name.

App login



Name could be the learner's name or a team name, depending on:

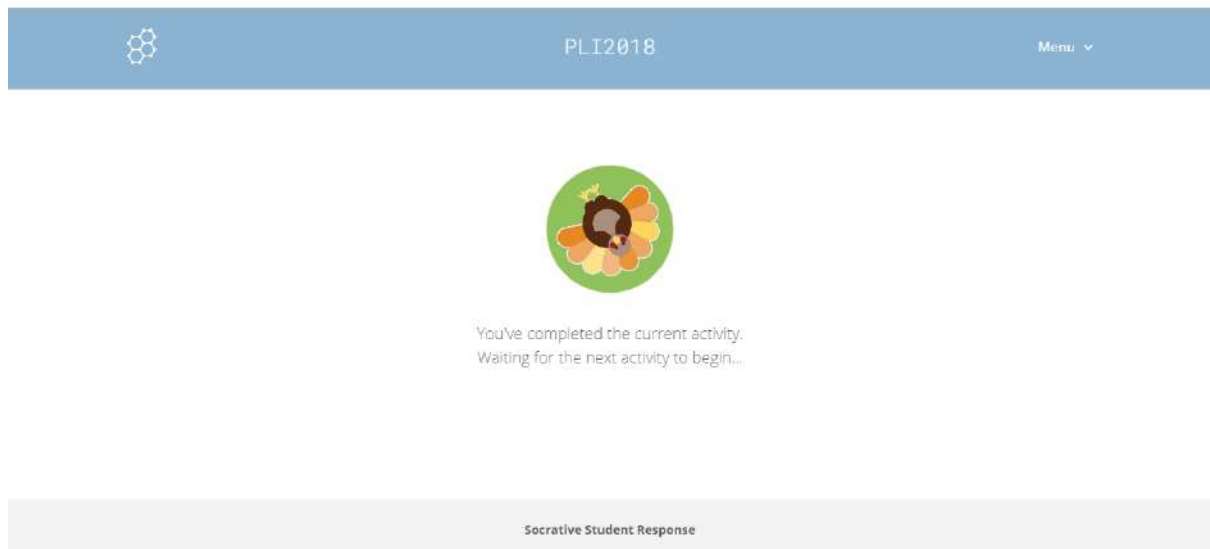
- how you want to conduct the activity
- how you want to recognise prior learning
- how you use this information in teaching and learning

Or, the responses could be anonymous. In this case the 'Enter your name' page does not appear and the learner goes straight into the quiz.

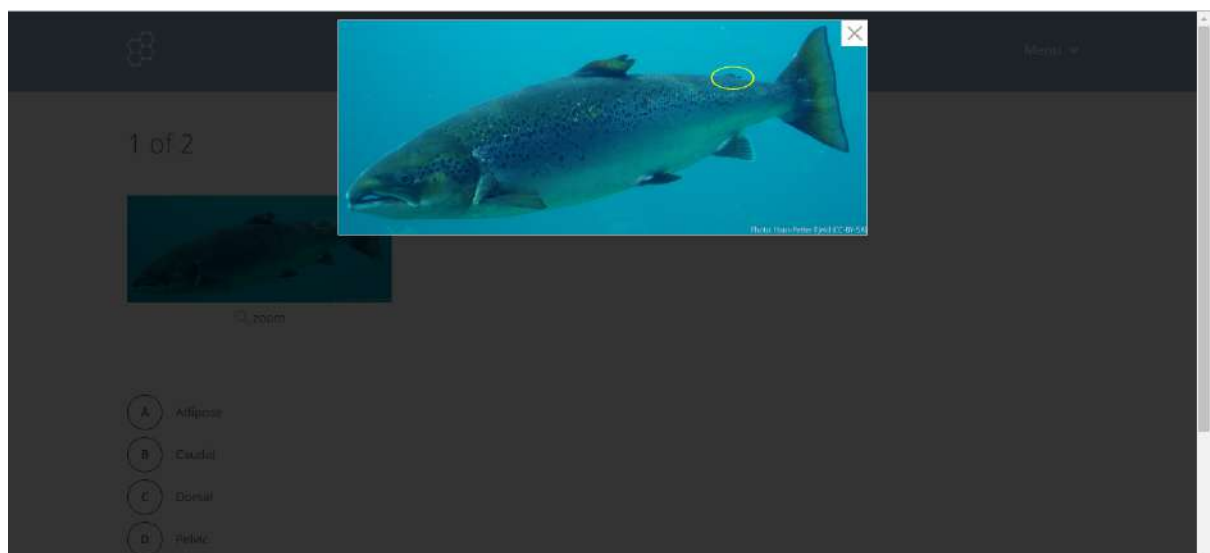
(You select these options when you launch the Quiz.)



Teacher Paced quiz. Each question appears when the teacher sees on their screen that all the learners have answered. The teacher then presses the Next button and the next question appears on the learner's screen.



In the **Teacher Paced quiz**, this screen appears on the learner's device once they have answered the question and they are then waiting for the teacher to progress the quiz to the next question.

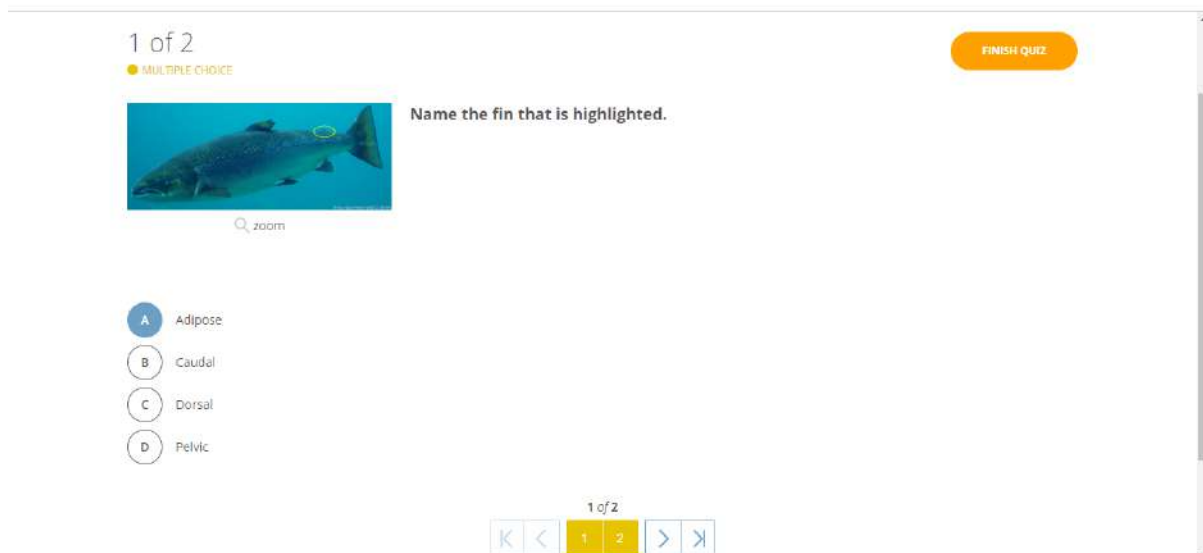


The image in the question can be zoomed. On a laptop, computer or tablet this zoom is to 100% of the original image size. (Limit of this actual size still to be determined). This image is 600px x 242px. Image zoom does not seem to work on an Android phone so it is pretty small and it would be difficult to see this particular fin.



You've completed the current activity.
Waiting for the next activity to begin...

This screen appears after the learner has finished the quiz. If a new quiz is run, then either the 'Enter your name' page appears, then the first quiz question or the learner is presented with the first question straight away (depending on the set up when the quiz was launched).

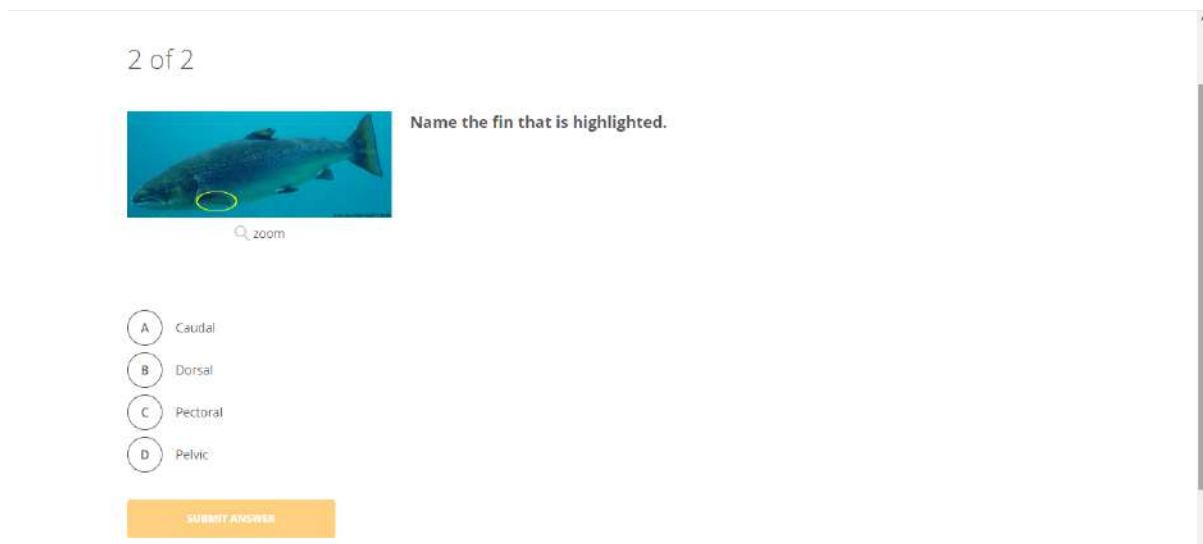


Open navigation quiz. Learners control the order they answer the questions and they can go back and change answers before they 'Finish Quiz' and thus submit their answers. Instant Feedback is not available. The teacher has to give feedback when the quiz is finished.



You've completed the current activity.
Waiting for the next activity to begin...

This screen only appears when the learner has finished the quiz.



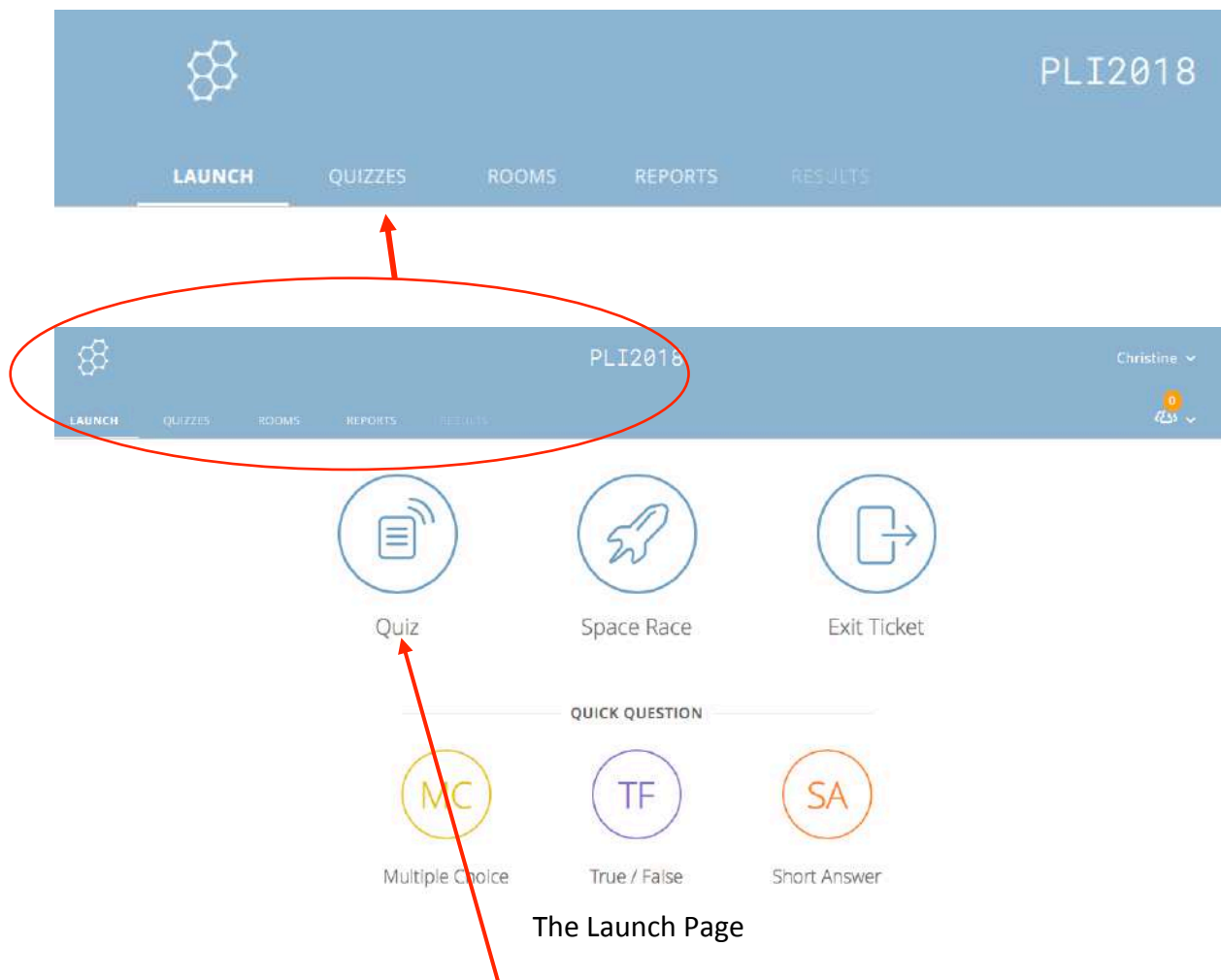
The Instant Feedback quiz setting gives a screen that looks just the same as the Teacher controlled. Learners can only answer the question once, they cannot navigate through the quiz and change answers. But they dictate the pace and do not have to wait for the teacher to show the next question.

They progress through the quiz and get instant feedback after they submit a question.



Settings can also allow them to get a final score.

The Teacher side: 1. The Launch page



The **Launch Page** is where you select a Quiz and make it active for the learner so that they can take the quiz/assessment. (The Quiz is first created in the Quizzes area)

An **Exit Ticket** is an online feedback sheet which you can use to ask pre-set questions about the Socrative activity. The learner must enter their name at the start.

Q1

How well did you understand today's material?

- A. Totally got it
- B. Pretty well
- C. Not very well
- D. Not at all

Q2

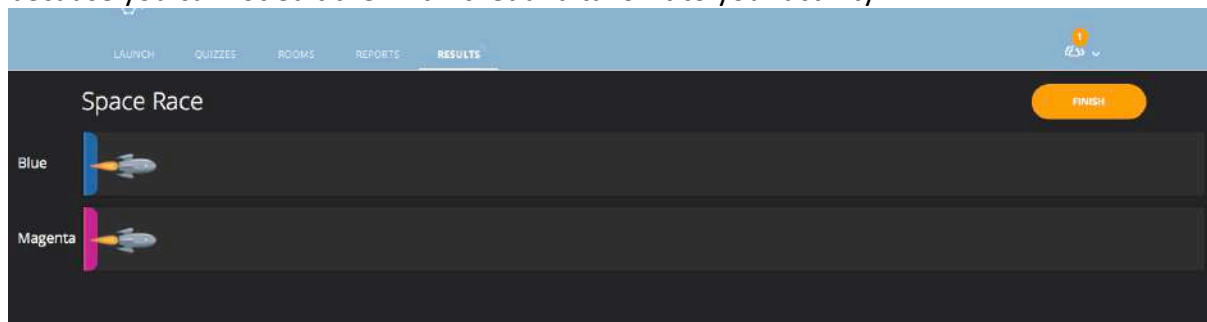
What did you learn in today's class? (Type in box)

Q3

Please answer the teacher's question. (Type in box)

You have to ask a question in class. It cannot be edited into the 'Exit Ticket'.

There is some potential in this for a Recognising Prior Learning activity but it is limited because you cannot edit the Exit Ticket and tailor it to your activity.

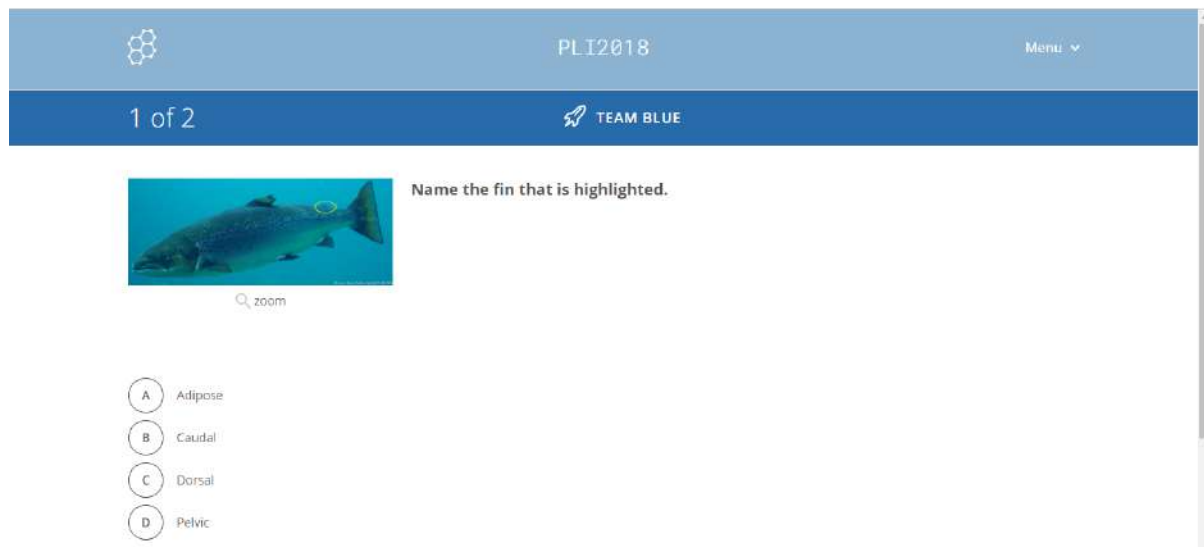


The **Space Race** is a way of adding a competitive edge while doing a quiz. It could be teams or individuals. It is part of the Teacher's pages so would need to be shared on a screen. Only therefore an option in a classroom situation really. Names are not displayed on the screen during the Race but are required to start and are included in the results on the Teacher's pages.

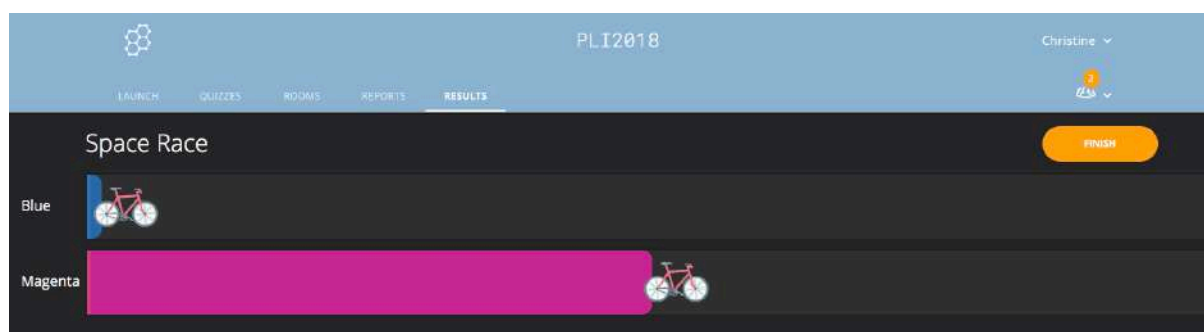
The 'Race' is based on how many right answers the 'team' gets, not on how quickly they finish the quiz. No countdown is possible in the Free version.

A screenshot of the 'Launch Space Race' dialog box. The dialog has a title bar with a close button. It contains two steps: '1 Choose Quiz' and '2 Choose Settings'. Step 2 is currently active. In the 'Choose Quiz' section, 'Fish Fins' is selected, and there is a 'Change' link. In the 'Choose Settings' section, there are several options: 'Teams' is set to '2', 'Icon' is set to 'Rocket', and 'Countdown' is set to 'None'. There are also radio buttons for 'Auto-assign' (selected) and 'Student Choice'. On the right side, there are toggle switches for 'Require Names' (checked), 'Shuffle Questions' (unchecked), 'Shuffle Answers' (unchecked), 'Show Question Feedback' (checked), 'Show Final Score' (unchecked), and 'One Attempt' (unchecked). At the bottom, there are 'PREVIOUS' and 'START' buttons.

With 'learner choice' selected in the Techer set up, this seems to mean that the learners choose their team (by colour). Each can answer questions but only the correct answers seem to count! Better to auto assign. Only one person has one colour – it is assigned as they log in. So a team must have only one team member put in the answer for the team.

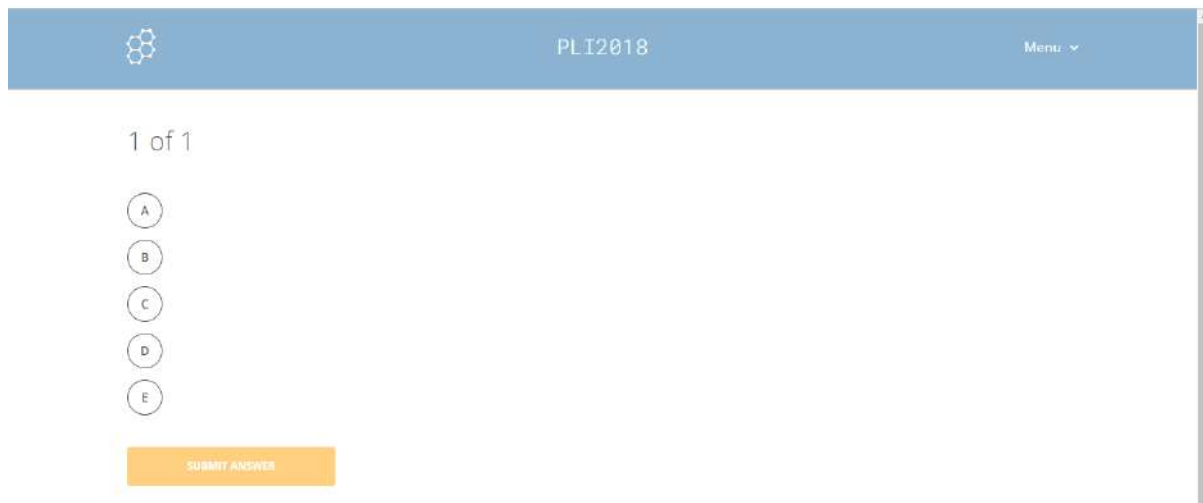


The learner/team know their team colour as it is highlighted on their quiz screen.



It is the Teacher who sees the Space Race progress on their pages so they have to project their screen onto a whiteboard/wall/screen so that the learners can watch the race as they work on their quiz questions.

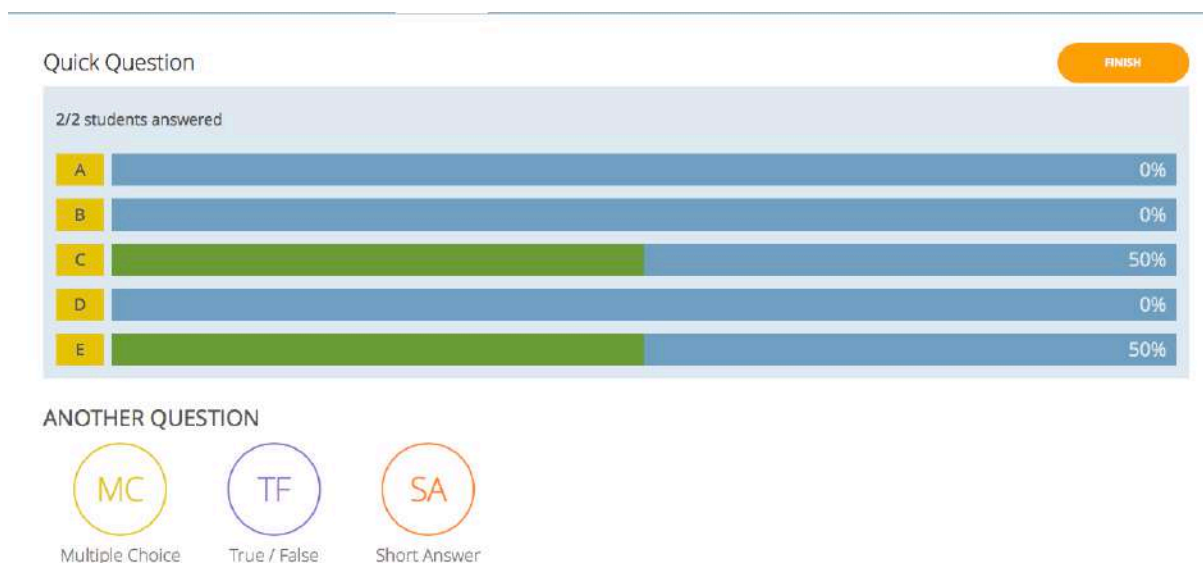
In the **Space Race** the pace is NOT controlled by the Teacher and the learners cannot go back to change their answers. They need to submit the answer to one question before they can move on to the next.



Quick Question Learner's screen

The **Quick Questions** are basically asked by the Teacher in class. Potentially it could be oral or projected on the screen as text/images/both.

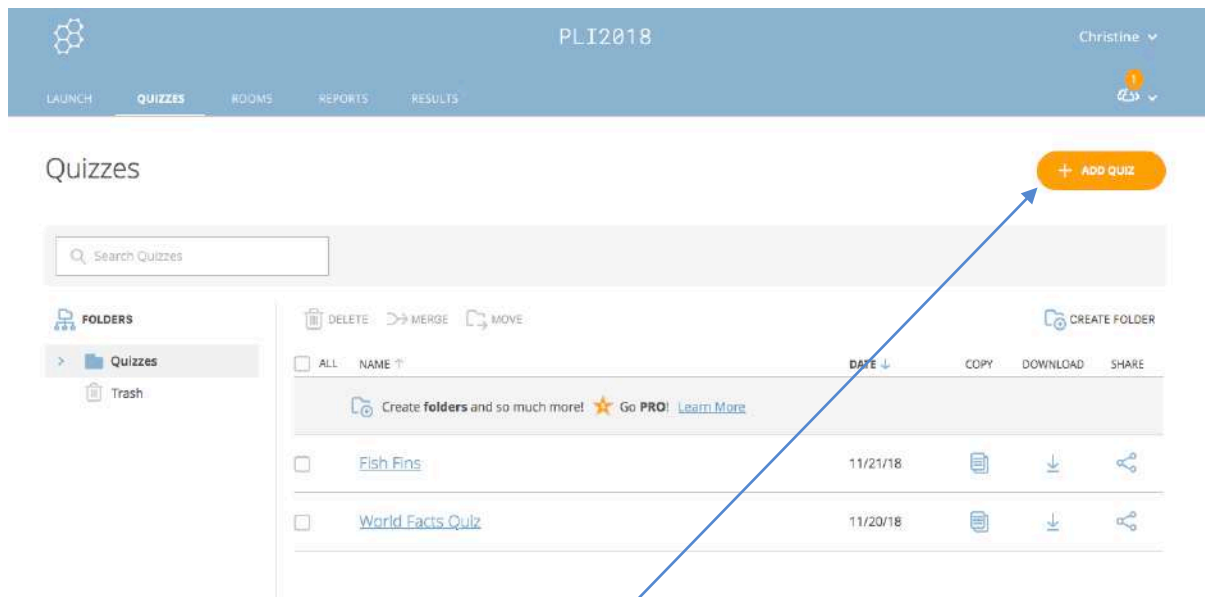
The learners select a letter only. They do not see the range of answers on their screen. Also, the number of options in the Free version is 5. This cannot be changed.



Quick Question Teacher's screen

Results are a 'live' feed and update onto the Teacher's screen which can be projected during the answering session or when all the results come in. There are not different colours for right or wrong answers as these are not set by the Teacher. This is basically a voting system, with live updates of the votes coming in and an opportunity for discussion of the results.

The Teacher side: 2. Creating Quizzes



The Free version does not allow more folders to be created.

To create a new Quiz, click Add Quiz.
This gives the options of: Create New or Import.



Import allows PLI to create quizzes in their account and share them to participating 'teachers' through the SOC number accessed when the quiz is in Edit mode. Enable sharing must be switched in – as in the screen shot here.

Quizzes can also be imported as an Excel spreadsheet.

The screenshot shows the 'Create Quiz' page. At the top, there's a navigation bar with 'LAUNCH', 'QUIZZES', 'ROOMS', 'REPORTS', and 'RESULTS'. The user 'Christine' is logged in. Below the navigation bar, the title 'Create Quiz' is on the left, and a 'SAVE & EXIT' button is on the right. A text input field contains 'Untitled Quiz'. Below this, there's a checkbox labeled 'Align quiz to standard'. Under the 'QUESTIONS' section, there are three buttons: '+ MULTIPLE CHOICE' (highlighted in yellow), '+ TRUE / FALSE' (highlighted in purple), and '+ SHORT ANSWER' (highlighted in orange). On the right, there's a toggle for 'Enable Sharing' with the code 'SOC-37338159'.

Creating a new quiz brings the screen shown as above. Three question types are available and they can all be used in one quiz.

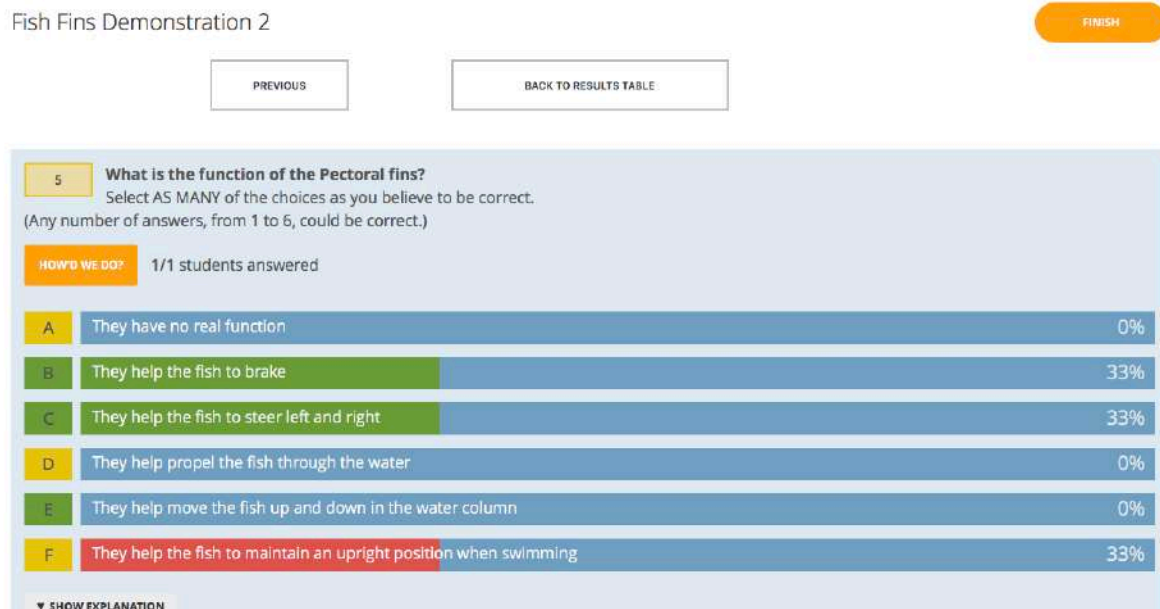
'Align Quiz to Standard' unfortunately relates primarily to USA education or the UK National Curriculum (ie English Schools and their levels). It does not relate to SQA or SVQs etc. So ignore this check box!

The screenshot shows the quiz editing interface for question #1. At the top, there's a 'Formatting' toggle and a 'SAVE' button. Below this, there's a text input field for the question: 'Name the fin that is highlighted.' Below the question, there's a table with four answer choices (A, B, C, D). Each choice has a text input field for the answer and a 'CORRECT?' checkbox. Choice A is 'Adipose' and is marked as correct. Choice B is 'Caudal', Choice C is 'Dorsal', and Choice D is 'Pelvic'. At the bottom, there's a '+ ADD ANSWER' button.

	ANSWER CHOICE	CORRECT?
A	<div><div>B I U x₂ x²</div><div>Adipose</div></div>	<input checked="" type="checkbox"/>
B	<div><div>B I U x₂ x²</div><div>Caudal</div></div>	<input type="checkbox"/>
C	<div><div>B I U x₂ x²</div><div>Dorsal</div></div>	<input type="checkbox"/>
D	<div><div>B I U x₂ x²</div><div>Pelvic</div></div>	<input type="checkbox"/>

A small image appears if added to the question, but this is Zoom-able. The image name is changed by Socrative so no problem with the right click on the image which will give the file name and possible answer!

Multi- answer multiple choice



The **multiple choice** allows for **Multi-answer** (all answers could be correct). Multi-answer questions are a powerful assessment tool. Unfortunately, Socrative limits this in a number of ways.

If 3 correct answers are created, the launched quiz will only allow 3 answers (any 3) to be selected. Similarly, 2, 4 etc. Thus, it is not possible to indicate to candidates that any number of answers e.g. in this case from 1 – 6 could be correct. If they tried to select them all when only 5 were correct, it would not allow this and 'the game' would be given away.

For Multi-answer, the **feedback** generated by Socrative to learners does not allow for 'partially correct'. It is either 'correct' or 'incorrect'. So effectively they are 'All or nothing' questions, sadly. The correct answers are given on the feedback, if this is selected at launch on the quiz settings that allow it. Some feedback could be through the 'explanation' entered on the questions editing page. An 'explanation' appears in instant feedback.

The analysis of Multi-answer questions is not particularly clever. The visual report via the teacher's screen '**How'd we do**' (see the image above) works in %ages of the total score applied across the correct answers. This is fine if only one learner has done the quiz (as here). BUT, with more than one learner attempting the quiz at the same time it doesn't show well the true values of how many answered each correct answer. It appears more 'proportional' rather than 'actual'.

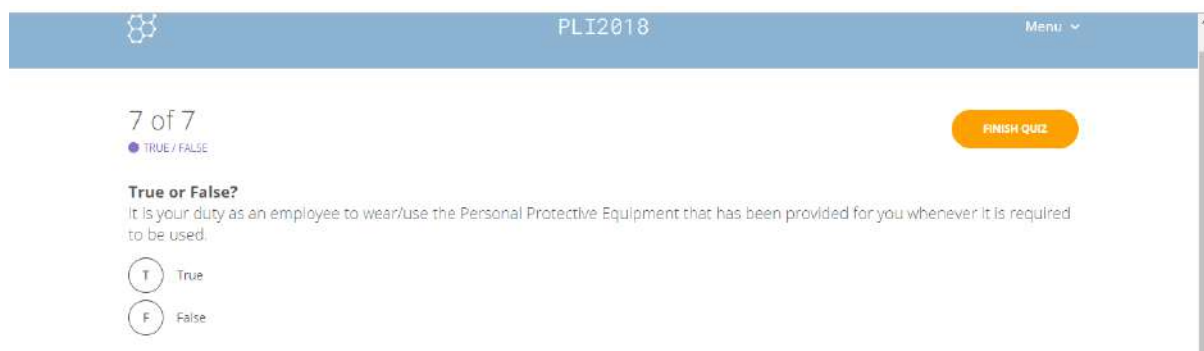
The PDF Report of individual question results does give the figures for how many checked each correct answer so this gives a correct evaluation but it is not so visual or quickly accessible.

Unfortunately, the **PDF result report for each individual** does not recognise any of their correct choices in a multi-answer question. If they don't get them all correct, even the ones they selected that were correct are shown in red as wrong! i.e. 'partially' correct is not recognised.

An example of an Individual Learner Result Report is in the Appendix.

When the quiz is attempted by **one learner at a time**, the PDF Report on the questions can be individualised by using a short answer (non-gradable) question at the start of the quiz to capture their full name. Although this report will not give their individual score, it will give a better representation of what they know in a multi-answer question. So, their prior learning will be better recognised. An example in the Appendix.

True False



The screenshot shows a quiz interface for a course titled 'PLI2018'. The progress indicator shows '7 of 7' questions. The current question is a 'True or False?' type. The question text is: 'It is your duty as an employee to wear/use the Personal Protective Equipment that has been provided for you whenever it is required to be used.' Below the text are two radio button options: 'True' and 'False'. A 'FINISH QUIZ' button is visible in the top right corner.

These should be used sparingly and with caution as they are basically 50:50 questions.

Short answer



The screenshot shows a quiz question labeled '#4'. It features a small image of a fish on the left. The question text is: 'Which fin is the Caudal Fin? Type the letter from the diagram into the box below.' Below the question is a large text input box. To the right of the input box is a 'Formatting:' toggle switch and a 'SAVE' button. Below the input box, there is a section for 'Correct Answers (Optional)' with a text box containing the letter 'E' and buttons for '+ADD' and '-DELETE'. At the bottom, there is an 'Explanation:' section.

Short answer questions can be used for ID in a potentially more demanding way than multiple choice.

Also useful for typing in the answer to arithmetic questions, finding values in tables etc.

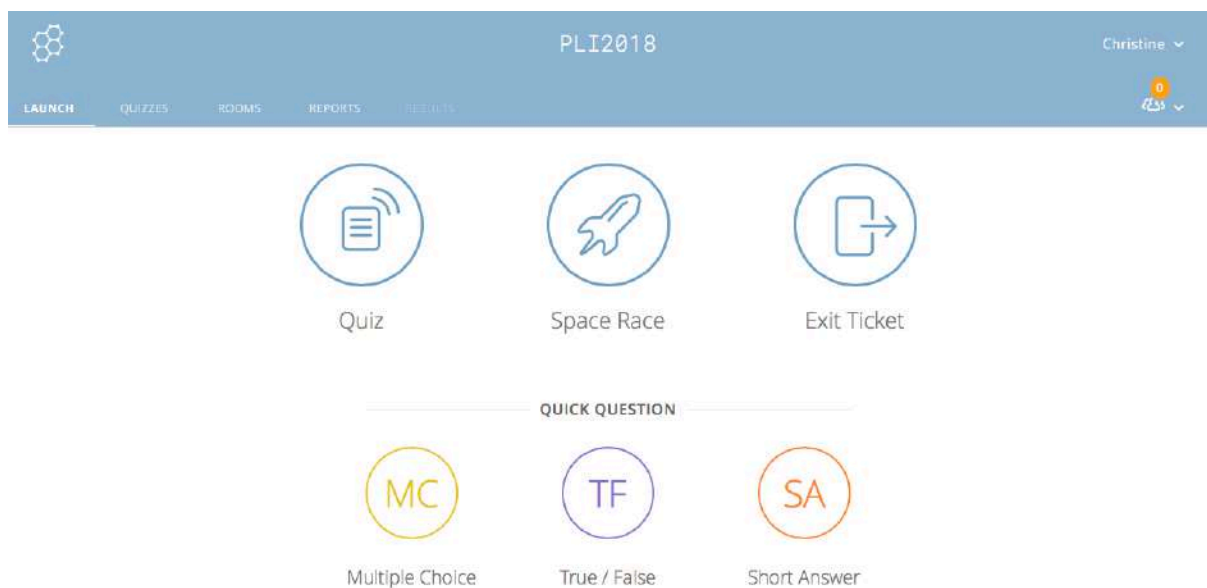
Spelling errors are a big issue for matching to the correct answer and therefore getting their point!

BUT usefully, matching to a correct answer is an option so it can be a very useful method of collecting learner understanding as they type into the box. This will be recorded in the learner record PDF and could be used as evidence.

Reminder:

Previously created quizzes and questions in the Socrative Excel template can also be imported. Quizzes, once imported, cannot be merged in the free version.

The Teacher side: 3. Running a Quiz



Once you have made a quiz, you need to Launch it from the Launch Page so that learner can access it.

There are two steps in the Launch.

Launch Quiz

1 Choose Quiz

Step 1 of 2

Search Quizzes

QUIZZES

NAME ↑

DATE ↓

Fish Fins Demonstration 2

11/25/18

World Facts Quiz

11/20/18

2 Choose Delivery Method and Settings

Step 2 of 2

PREVIOUS

NEXT

Step 1: Select the Quiz to be used.

Launch Quiz [Close]

1 Choose Quiz Fish Fins Demonstration 2 [Change](#)

2 Choose Delivery Method and Settings Step 2 of 2

Instant Feedback ?

Open Navigation ?

Teacher Paced ?

☒ Require Names

☐ Shuffle Questions

☐ Shuffle Answers

☐ Show Question Feedback

☒ Show Final Score

☐ One Attempt ?

PREVIOUS
START

Step 2: Choose delivery methods and settings

For more about the settings, see the first section: Learner Interface.

Teacher Paced quiz. Each question appears when the teacher sees on their screen that all the learners have answered. The teacher then presses the Next button and the next question appears on the learner's screen.

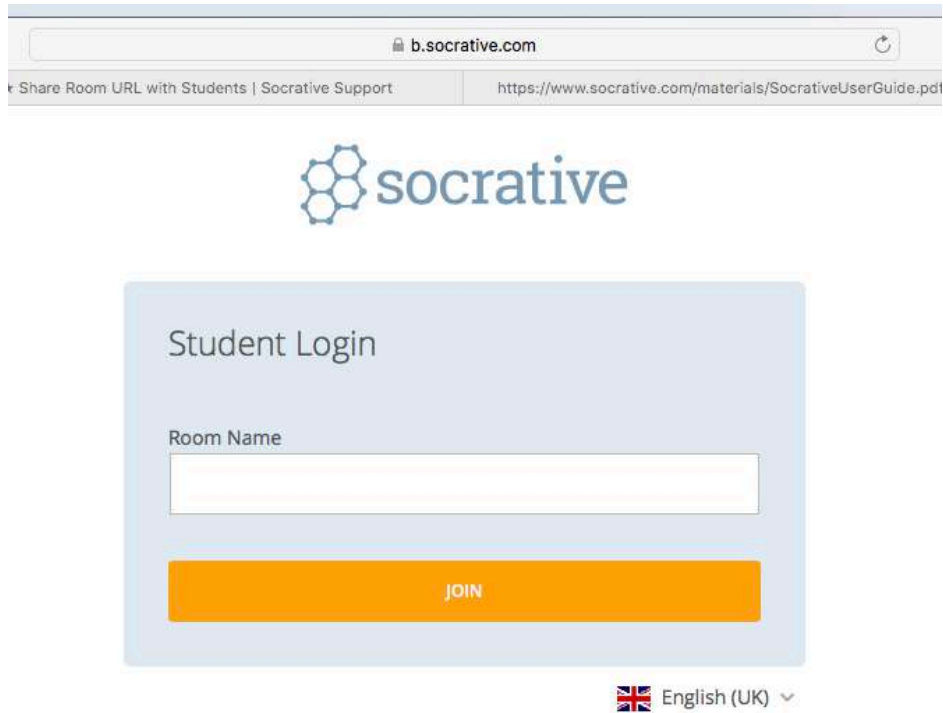
Question Feedback after they answer each question and **Final Score** are both options in the setting. An explanation is possible with feedback. Both the giving of feedback and explanations as the learner goes through the quiz depends on whether they are to learn as they go along or simply show what they already know and understand (RPL/APL)

Open navigation quiz. Learners control the order they answer the questions and they can go back and change answers before they 'Finish Quiz' and thus submit their answers. Instant Feedback is not available. The teacher has to give feedback when the quiz is finished.

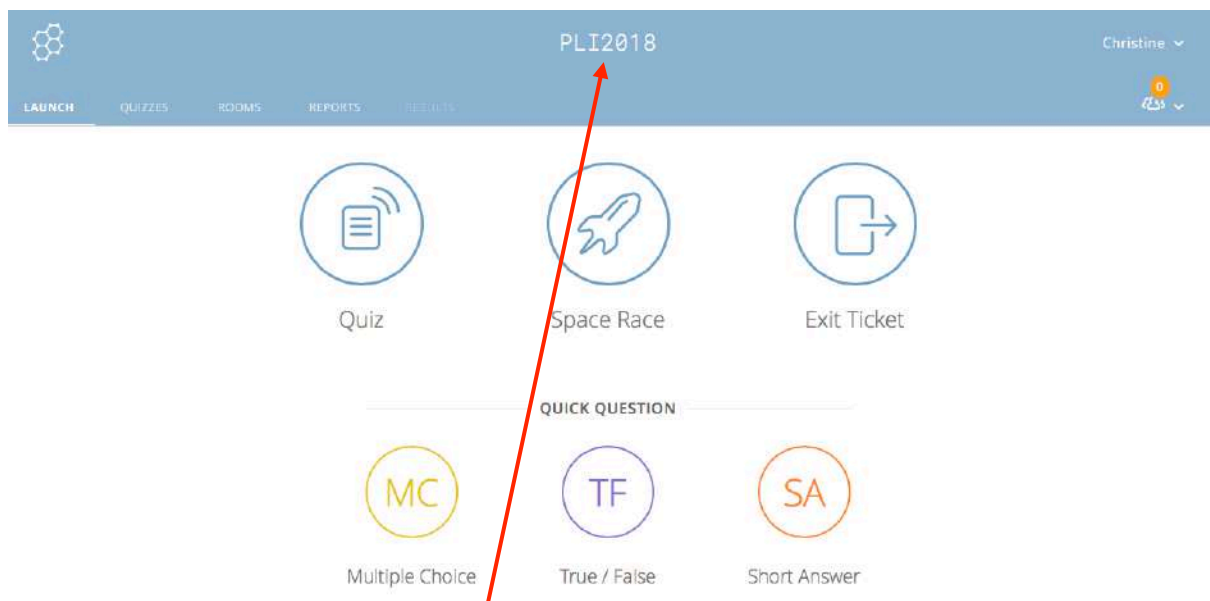
The Instant Feedback quiz setting gives a screen that looks just the same as the Teacher Paced. Learners can only answer the question once, they cannot navigate through the quiz and change answers. But they dictate the pace and do not have to wait for the teacher to show the next question.

They progress through the quiz and get instant feedback after they submit a question. Explanations and a final score is also possible.

Shuffling answers is **never** recommended as the layout of the answers has been done with regard to readability and best practice.



The learners then go to the Learner log in via <https://socrative.com> or their app.



The teacher gives the learners the name of the room to log in with: PLI2018 in this case.

If you have selected 'Require Names' in the settings, this will be the next page to appear before the quiz becomes available. FULL NAME is recommended as this will give stronger validity for the evidence generated.

The Teacher side: 4. The Quiz in progress

Fish Fins Demonstration 2

PREVIOUS

2

NAME THE FIN THAT IS HIGHLIGHTED.

zoom

HOW'D WE DO? 0/1 students answered

A Adipose

B Caudal

C Dorsal

D Pelvic

SHOW EXPLANATION

NEXT

FINISH

Teacher paced quiz: teacher's view

The teacher's control buttons are above the question itself.

The teacher can monitor the results by clicking on the orange button 'How'd we do' while the learners are answering that question.

The number of learners in the room and how many have answered the question is shown here.

Fish Fins Demonstration 2

FINISH

Show Names Show Answers

Name	Progress (%)	1	2	3	4	5	6	7
Dorothy Brown	43%	Dorothy	A	C				
Class Total			100%	100%				

Click question numbers or class total percentages for detailed views.

Open Navigation and Instant Feedback: teacher's view

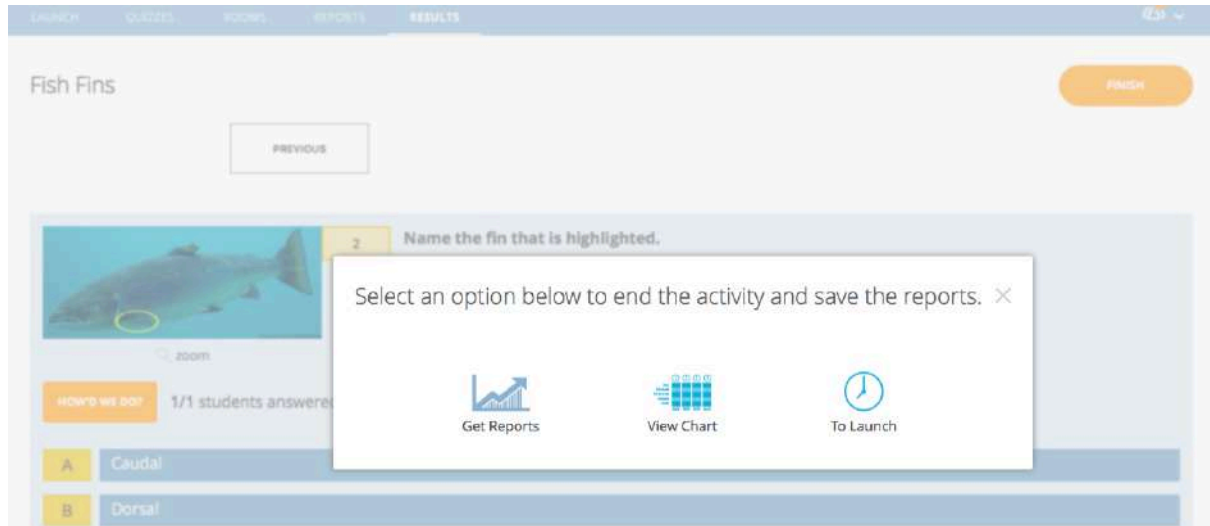
While the **Open Navigation** and **Instant Feedback** quizzes are underway, the teacher does not see the question screen.

They follow each learner's progress on the Results table shown above. Here there is only one learner doing the test.

When the quiz has been completed and 'Finished' by all the learners (or they have used all the time you have given them), the teacher also has to Finish the quiz (orange Finish button).

On all three quiz settings, once the teacher has 'Finished' the quiz, the teacher view gives a screen with report options.

The Teacher side: 5. The Quiz on 'Finish'



'Finish' activity report options screen

Name ↑	Score (%) ↓	1	2	3	4	5	6	7
*****	67%							
Class Total		100%	100%	0%	100%	0%	100%	

Click question numbers or class total percentages for detailed views.

View Chart

The **View Chart** option hides the names and results by default so that if you are sharing this with the learners on the classroom screen to discuss the results, you are not caught out! The chart is the table of results that the teacher sees as the learners are doing the Open Navigation and Instant Feedback quizzes.

By clicking on the question number you are taken to the individual question in the quiz and can access 'How'd we do' to see the class (or individual if only one took the test) response to that question.

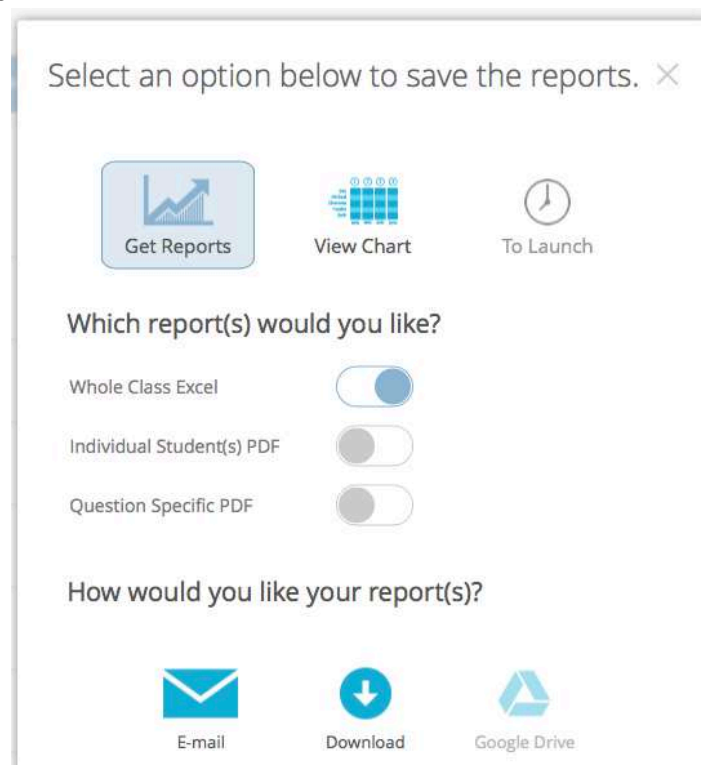
To Launch means that you can simply close the quiz and do not view the chart or get reports at this stage. However, the results are still stored in the teacher's space, under Reports (See next page). These can be accessed at any time.

LAUNCH QUIZZES ROOMS REPORTS RESULTS																								
<div> <div> <input type="text" value="Search PLI2018"/> <input type="button" value="SEARCH"/> </div> <div>Filter by PLI2018 (32)</div> </div> <div> <input type="button" value="ARCHIVE"/> <input type="button" value="DELETE"/> </div> <table> <thead> <tr> <th><input type="checkbox"/> ALL</th><th>NAME ↓</th><th>DATE ↓</th><th>ROOM ↓</th><th>TYPE ↓</th></tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td><td>Fish Fins Demonstration 2</td><td>11/25/18 8:03 PM</td><td>PLI2018</td><td>Quiz</td></tr> <tr> <td><input type="checkbox"/></td><td>Fish Fins Demonstration 2</td><td>11/25/18 7:43 PM</td><td>PLI2018</td><td>Quiz</td></tr> <tr> <td><input type="checkbox"/></td><td>Fish Fins Demonstration 2</td><td>11/25/18 6:07 PM</td><td>PLI2018</td><td>Quiz</td></tr> </tbody> </table>					<input type="checkbox"/> ALL	NAME ↓	DATE ↓	ROOM ↓	TYPE ↓	<input type="checkbox"/>	Fish Fins Demonstration 2	11/25/18 8:03 PM	PLI2018	Quiz	<input type="checkbox"/>	Fish Fins Demonstration 2	11/25/18 7:43 PM	PLI2018	Quiz	<input type="checkbox"/>	Fish Fins Demonstration 2	11/25/18 6:07 PM	PLI2018	Quiz
<input type="checkbox"/> ALL	NAME ↓	DATE ↓	ROOM ↓	TYPE ↓																				
<input type="checkbox"/>	Fish Fins Demonstration 2	11/25/18 8:03 PM	PLI2018	Quiz																				
<input type="checkbox"/>	Fish Fins Demonstration 2	11/25/18 7:43 PM	PLI2018	Quiz																				
<input type="checkbox"/>	Fish Fins Demonstration 2	11/25/18 6:07 PM	PLI2018	Quiz																				

Clicking on any of the quizzes in the Reports page gives the options once again:



Get Reports allows:



Examples of each of these reports are in the Appendix below.

Class 11_25_2018_18.07.QZ_fishfinsdemonstration2										
Home Insert Page Layout Formulas Data Review View										
Paste Cut Copy Format Arial 16 Bold Italic Underline Text Color Background Color Conditional Formatting Format as Table Percentage Wrap Text Merge & Center										
fx 50%										
Student Names	Student ID	Total Score (0 - 100)	Number of correct answers	Please type your FULL NAME in the box below before you start this quiz.	Name the fin that is highlighted.	Name the fin that is highlighted.	Which fin is the Caudal Fin? Type the correct letter from the diagram into the box below.	Name the external feature that the red arrow is pointing to.	What is the function of the Pectoral fins? Select AS MANY of the choices as you believe to be correct (Any number of answers, from 1 to 6, could be correct.)	True or False? It is your duty as an employee to wear/use the Personal Protective Equipment that has been provided for you whenever it is required to be used.
Dorothy Brown	-	67	4	Dorothy Brown	Adipose	Pectoral	e	Maxilla	They help the fish to brake., They help the fish to steer left and right.	True
Martyn	-	100	6	Martyn Heines	Adipose	Pectoral	E	Lateral line	They help the fish to brake., They help the fish to steer left and right, They help move the fish up and down in the water column.	True
Class Scoring		83.3%	5.00	0.0%	100.0%	100.0%	100.0%	50.0%	50.0%	100.0%

An introduction to creating multiple choice questions (Objective tests)

‘What they are, when to use them and how to create them’

Contents

What they are	42
Illustration of the range of objective tests	43
Multiple choice (Select one answer)	43
Multiple choice (Multi answer, marks taken off for wrong answers)	44
Multiple choice (Multi answer, All or Nothing)	44
True or False	45
Select missing words (drop down boxes)	45
Short answer -Type in the answer	46
Two or more questions in one (Embedded answers)	47
Drag and drop words into text.....	48
Drag and drop onto image.....	48
Drag and drop markers/target.....	49
Drag and drop to match images	49
Drag and drop text / images to create a sequence	50
Matching.....	50
When to use online objective tests	51
1. Recognising Prior Learning	51
2. Formative assessment	51
3. Summative assessment	52
Other reasons for developing online objective tests.....	52
Allowing the reticent learner to engage with the class	52
Storing and sharing results	52
When NOT to use objective testing	52
How to create multiple choice questions / objective tests.....	53
1. Planning and process	53
2. Creating valid objective tests.....	53
a) Well constructed.....	53

b). Technically sound	61
Notes on uploading to the question software	66
1. Preparing pictures.....	66
2. Direct import of questions from Microsoft Word/Excel.....	66
Moodle	66
Socrative	66
3. Microsoft Word pasted into Moodle/VLE/software.....	67
Comparison of question types in Socrative and Moodle	68
An example of a question development format in Word	69
References used in the development of this Guide.....	70

Multiple choice questions (Objective tests)

What they are

In this Guide we are looking specifically at creating a range of multiple choice type questions that can be used online.

Multiple choice questions are also known as ‘objective tests’. ‘Objective tests require a user to choose or provide a response to a question **whose correct answer is pre-determined.**’ (Ref 1)

There is no room for a subjective response or opinions from the user. The options themselves must be either right or wrong, so that the question can be marked objectively.

Given this definition, objective tests can go well beyond the simple ‘choose one correct answer from four or five listed’.

For example:

- Multiple choice (select one)
- Multiple choice (multi-answer)
- Multiple choice (multi-answer with all or nothing marking)
- True or False (the simplest of multiple choice!)
- Fill in the blanks in the text from the drop down boxes
- Type in the answer (short answer)
- Drag and drop words into the text
- Drag and drop answers onto an image
- Drag and drop markers/target
- Drag and drop to match images
- Drag and drop text/images to create a sequence
- Matching

There are many tools available for creating ‘online questions’. These may be within the VLE itself, software that provides questions that can be embedded into the VLE (e.g. H5P) or independently operating software such as the One2Act and Socrative Rapid Response Technologies.

Video as well as still images can often be used within questions, in the appropriate question type.


The ‘Good Practice’ put forward has been gleaned from national advisors in Scotland and from around 15 years’ experience of developing online assessments in bespoke software and the Moodle VLE.

Much of the good practice outlined in ‘How to create them’ can also be applied to creating ‘objective’ tests that are to be used on paper.

The two main sources of advice were the Scottish Qualifications Authority and COLEG (the Colleges Open Learning Exchange Group, now merged and subsumed into the Colleges Development Network).


Illustration of the range of objective tests

Multiple choice (Select one answer)

PLI2018

3 of 7

MULTIPLE CHOICE



Name the fin that is highlighted.

Zoom

☐ A Caudal

☐ B Dorsal


☒ C Pectoral


☐ D Pelvic


(Shown in Socrative)

Identify the BOWLINE knot.

Select one:

☐

☐

☐

Picture as answer (developed in Moodle)

Multiple choice (Multi answer, marks taken off for wrong answers)

Which of the following ingredients provide a source of protein in salmonid diets?

Select as many as you believe to be correct.

(Any number of answers, from 1 to 6, could be correct. Marks taken off for wrong answers)

Select one or more:

- ☐ Fish oil
- ☐ Fish meal
- ☐ Blood meal
- ☐ Astaxanthin
- ☐ Wheat meal
- ☐ Soya bean meal

(Developed in Moodle- any number of selections can be made, regardless of number of correct answers. Marks are deducted for wrong selections.)

Multiple choice (Multi answer, All or Nothing)

(K13) Which of the following salmonid feed ingredients pigment the fish flesh?

Select as many as you believe to be correct. (One or more may be correct.)

ALL correct answers must be selected.

NO MARK is given if there are any mistakes.

- ☐ A Fish oil
- ☐ B Minerals
- ☐ C Astaxanthin
- ☐ D Canthaxanthin
- ☐ E Soya bean meal

(Shown in Socrative -the only type of multi-answer multiple choice in Socrative. This software only allows as many selections as there are correct answers, but any answers can be selected.

NOTE: *not* the conventional square check box.

In Moodle, the Multi-answer All or Nothing question allows any number of answers to be selected, regardless of the number of correct answers.)

True or False

7 of 7

TRUE / FALSE

FINISH QUIZ

True or False?
It is your duty as an employee to wear/use the Personal Protective Equipment that has been provided for you for a task.

☒ True
☐ False

(Shown in Socrative)

Select missing words (drop down boxes)

Select the correct words from each drop down menu to complete this information about protein in the diet of farmed salmon.

Proteins are composed of which are used by the fish to build .

Proteins are also used in the formation of enzymes and .

The protein requirements of young fish are than for mature fish.

Sources of protein in commercial fish food include and .

(Developed in Moodle)

The following three True/False questions are about factors that influence the Food Conversion ratio.
Select the correct answer from each drop down box.

True or False?
Fish escapes will improve the FCR.

True or False?
Food wastage will make the FCR poorer.

True or False?
Dissolved oxygen levels can affect the FCR value.

(Developed in Moodle)

Short answer -Type in the answer



What is the scientific name for the Atlantic Salmon?

Type the name in the box below.

Correct spelling and format are essential to gain the mark.

Answer:

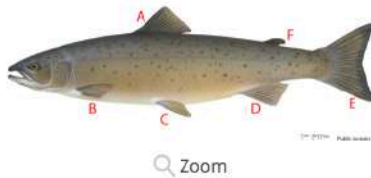


The correct answer is: *Salmo salar*

(Developed in Moodle)

4 of 7

● SHORT ANSWER



Which fin is the Caudal Fin?

Type the correct letter from the diagram into the box below.

Zoom

Enter Answer Here

(Shown in Socrative)

Multiply 64 by 12.

Type your answer in the box below.

Answer:

(Developed in Moodle)

Two or more questions in one (Embedded answers)
(CLOZE)

How do you calculate the Food Conversion Ratio of fish stock over a given period?

Select the correct FCR calculation.

- ☒ Weight of food fed DIVIDED BY the change in the biomass of the stock
- ☐ Weight of food fed MULTIPLIED BY the change in the biomass of the stock
- ☐ The change in the biomass of the stock DIVIDED BY the weight of food fed
- ☐ Weight of food fed DIVIDED BY the change in the average weight of the stock

Which ONE of these FCR values is the POOREST?

- ☐ 2
- ☐ 1
- ☒ 0.8

(Developed in Moodle)

How do you calculate the Food Conversion Ratio of fish stock over a given period?

Select the correct FCR calculation.

- ☐ Weight of food fed DIVIDED BY the change in the biomass of the stock
- ☐ Weight of food fed MULTIPLIED BY the change in the biomass of the stock
- ☐ The change in the biomass of the stock DIVIDED BY the weight of food fed
- ☐ Weight of food fed DIVIDED BY the change in the average weight of the stock

**2000 salmon weighing 650 Kg in total were fed 100 Kg of food over one week.
They then weighed 775 kg in total.**

Calculate the FCR and type your answer in the box below.

(Developed in Moodle)

Drag and drop words into text

Drag and drop the correct text to complete each sentence about nautical terms.
Words can be used as often as you wish.

The distance from the water to the lowest point of the vessel where water could come on board is called the .

The maximum width of a boat is: .

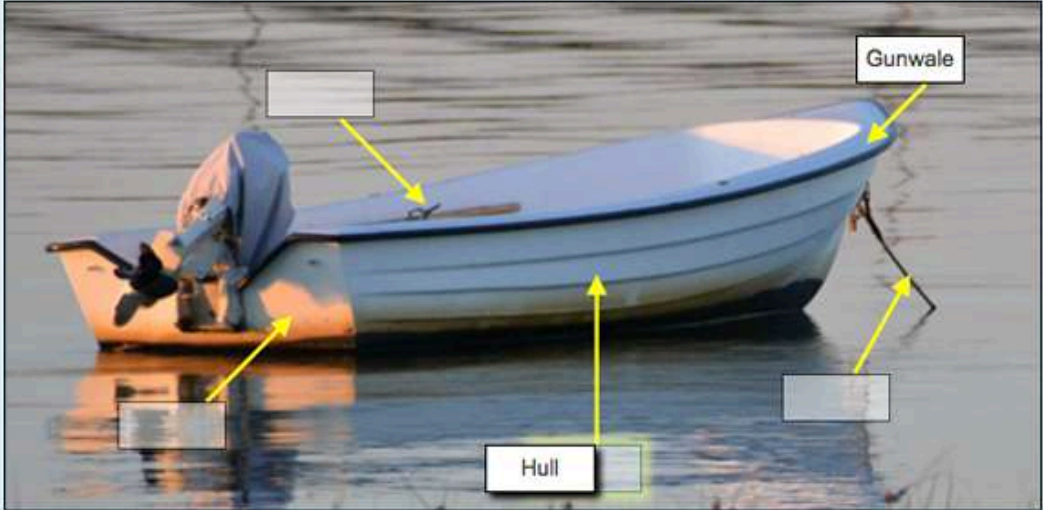
The term that describes the body of the vessel is the .

(Developed in Moodle)

Drag and drop onto image

Images and/or text labels are dragged and dropped into drop zones on a background image. The background image in Moodle is limited to 600 x 400 pixels.

Label the parts of this boat by dragging and dropping the correct term to each box.



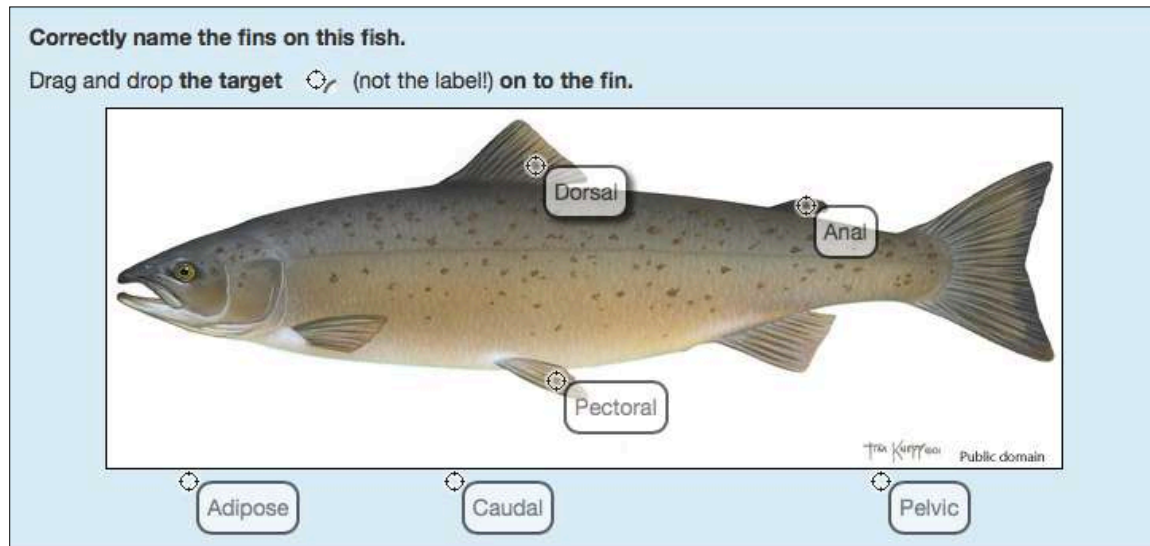
(Developed in Moodle – text labels only.)

In this question type it is not possible to put the text BELOW the image.)

Drag and drop markers/target

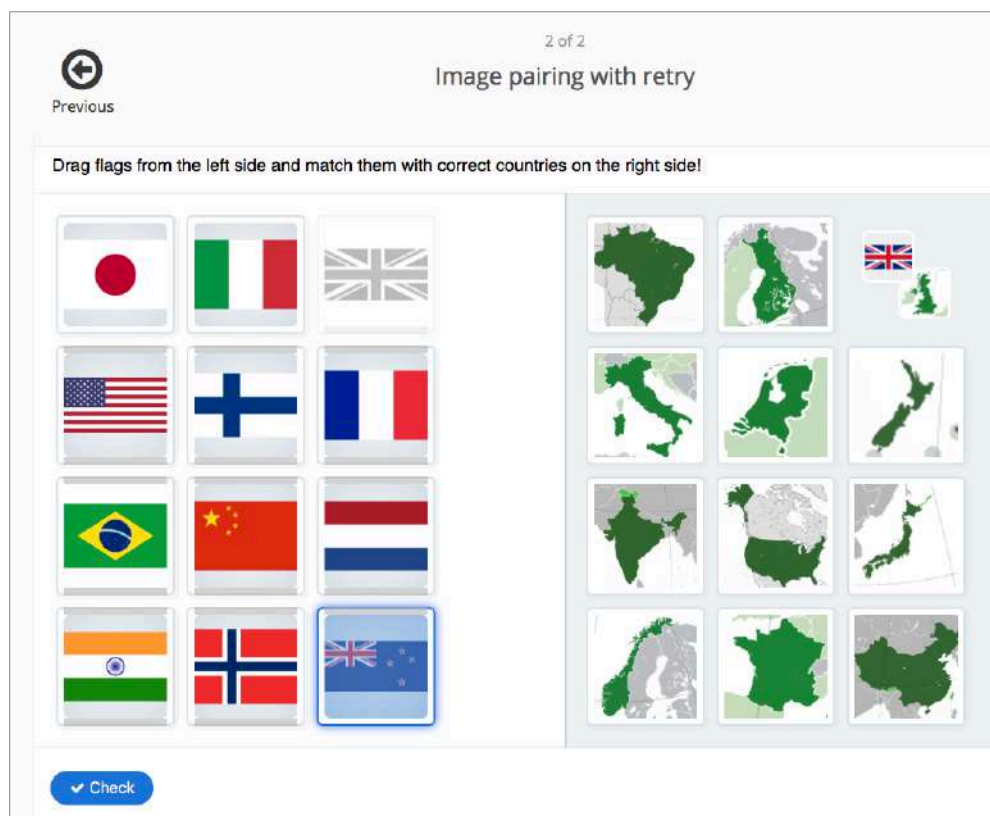
(The target circle must be placed in the correct area. The 'target circle' can be changed to a clearer/more distinctive image).

Background image is limited to 600 x 400 pixels.



(Developed in Moodle. In this question type it is not possible to put the text BELOW the image.)

Drag and drop to match images



(Example from <https://h5p.org>)

Drag and drop text / images to create a sequence

Images and/or text labels are dragged and dropped into drop zones on a background image. The background image in Moodle is limited to 600 x 400 pixels.

This diagram shows some of the stages in the life cycle of the Atlantic Salmon.

Drag and drop each item to correctly place each image in the diagram and label this stage.

The diagram illustrates the life cycle of the Atlantic Salmon. It features a central image of a mature salmon. Surrounding it are five stages, each with a corresponding image and a label box:
1. **Egg**: A cluster of orange eggs.
2. **Alevin**: A small, yellowish, translucent fish with a red spot.
3. **Smolt**: A small, silvery fish.
4. **Parr**: A small, brownish fish with dark spots.
5. **Mature adult**: A large, dark fish.
Red arrows indicate the sequence: Egg → Alevin → Smolt → Parr → Mature adult. The diagram includes drag-and-drop boxes for images and labels.

Labels: Smolt, Mature adult, Egg, Parr, Alevin.

(Developed in Moodle – both images and text labels are dropped onto the background image of the arrow diagram including the mature fish. Text is set to be used more than once, if desired.)

Matching

Match the correct name to the stage in the Atlantic Salmon life cycle.

The matching exercise shows three images of salmon stages:
1. Alevin: A small, yellowish, translucent fish with a red spot.
2. Smolt: A small, silvery fish.
3. Parr: A small, brownish fish with dark spots.
A dropdown menu is open, showing the following options:
✓ Choose...
Smolt
Alevin
Mature adult
Parr

(Developed in Moodle)

When to use online objective tests

Good objective tests take a lot of time to create, particularly in the writing of them. Finding/creating and preparing images can also take a considerable amount of time. Then there is also the time needed to get them into the software system.

A realistic estimate for creating the finished item is 3 questions per day.

However, this time can rapidly be recovered when:

- there are large numbers of candidates
- there is instant marking and feedback to candidates
- results can be automatically collated and stored in the VLE or exported if required
- the course is well established and the material can be used year on year

The use of online objective tests then reduces the amount of marking for staff members and improves the timeliness of results/feedback to candidates.

There are many opportunities within a learning programme for using online objective tests.

1. Recognising Prior Learning

In this situation, the objective test/s are used before a course begins or at the start of the course to identify the candidates' prior knowledge and possible mis-conceptions. An Individual Training Needs Analysis may be developed as a result. The focus of classroom teaching may also be refined.

2. Formative assessment

Formative assessment takes place during a course of study. It gives the candidate the opportunity to practice and develop skills and understanding. For example: they could practice the naming and location of fish anatomy or identifying different fish species.

Learning can be improved because:

- Candidates can get instant results and targeted feedback
- The feedback can include images, audio and video
- Skills can be practiced e.g. species ID
- Formative assessment can prepare the candidates for summative assessment, though care should be taken that they are not simply learning 'how to do the assessment'

Analysis of formative assessment results can help to improve teaching because these can indicate:

- where there are common wrong answers being selected and therefore potentially:
 - learners are having a problem
 - teaching has not been effective
 - where teaching and learning needs to be targeted
 - the question itself is not well constructed
- where the Options themselves could be improved (for example, if a distractor is NEVER selected, then it is not doing its job and should be removed and, if possible, a better one found)

3. Summative assessment

A summative assessment is used to make a judgement of each candidate's achievement in relation to the learning objectives of an award. This assessment is usually during or towards the end of a course but it could also be prior to it, thus Accrediting Prior Learning.

Other reasons for developing online objective tests

Allowing the reticent learner to engage with the class

Response Technology, such as One2Act or Socrative can allow learners to remain anonymous when class results are shared/viewed. Thus, quiet or timid learners who find it difficult to engage in open discussions on topics are more able to take part in contributing to the class knowledge and the teacher's understanding of 'where the learners are' in their learning.

Storing and sharing results

If set up correctly, the Grade Book in a VLE can provide results online to learners, their mentors and their employers. The data is gathered automatically into the one Grade Book. Each of the different 'roles' can be given different levels of access to these results.

The Grade book system also has the potential to act as a form of e-Portfolio, though not one that the learners could take with them when they leave the course.

When NOT to use objective testing

As we have seen, creating objective tests is front loaded with time. The benefits must outweigh the 'costs' of producing them.

Furthermore, objective testing is not always an appropriate assessment method.

- Objective tests do not allow candidates to express their own opinion or demonstrate their creativity.
- It is difficult to assess problem solving ability when the candidate has to select from a range of 'solutions'. A 'blank page' is generally far more effective.
- Similarly, a candidate's understanding of a subject may not be truly tested by selecting from options; but it is not impossible in the right circumstances.
- Clearly, few practical skills can be demonstrated through online objective testing.
- The subject matter being tested must have clearly correct answers. Maths and science are full of opportunities for objective testing whereas many aspects of animal husbandry, for example, are based on opinion or highly variable circumstances so are definitely not!

(Ref 2)

Both professional judgement on 'when' to use objective testing and creativity in recognising opportunities are required. Combining objective testing with other assessment methods increases the validity and reliability of the overall assessment plan.

How to create multiple choice questions / objective tests

1. Planning and process

Creating effective objective tests is a team effort. Subject expert and scrutiniser are the minimum number in the team. Someone with experience in creating online objective tests, regardless of the subject matter, is a very valuable addition to the team.

- Analyse the learning outcomes of the qualification and what needs to be assessed.
- Recognise the types of assessment that **must** be used and identify the opportunities for objective testing.
- Identify the type of objective test that best suits each identified opportunity.
- Prepare the questions in Word first (it is much easier to share, edit, spell check etc in Word than in the question software) and work with subject experts and others to refine and finalise each the question. DON'T use tables in your formatting, this makes transfer of text much slower. Decide on an agreed format in your Word doc that meets your needs before you start. A disciplined titling system pays dividends in the future for finding specific questions. An example of a format is given at the back of this guide.
- Create/source any artwork and images.
- If these questions are a summative assessment or APL, ensure that they meet any internal / external approval requirements.
- Upload questions to software and system (including results system, if required).
- Test!!
- Use
- Improve

2. Creating valid objective tests

A valid item allows candidates to show that they have the required knowledge / understanding / skills to meet learning outcome(s) of that qualification. (Ref 3)

It needs to be:

- a) Well constructed and grammatically correct
- b) Technically sound

a) Well constructed

The basic principles of objective testing are most easily seen by looking at a simple multiple choice question (one correct answer from a number of choices – see page 6).

Construction is based on:

- the individual parts of the question (the **Stem** and the **Options**)
- the **layout** of these parts

The Stem (Ref 2)

This is the text of the question and should be a single, unambiguous statement or question. Don't be tempted to write 'clever' or 'tricky' text. Keep it simple and straightforward. You are usually assessing the candidate's knowledge and skills relating to a subject, not their reading skills.

- It should be concise and clear and only contain information that is directly relevant. There may, however, be an introduction to the question/creation of a scenario before the stem.

- The candidate should therefore be able to answer the question without looking at the Options i.e. the Options are answers to the question, not a way of working out what the question is.
- Avoid duplicating text in each option, include it in the Stem.
- Avoid giving clues in the Stem.
- If an image is part of the question (but not the question itself!) make sure it is labelled so that candidates are not wasting time trying to work out what it is.

The Stem of True/False questions (Ref 1)

True/False questions are a very simple form of multiple choice question, in that there are only two choices: True or False. However, they are not necessarily simple to write as it can be difficult to create a stem that has two such absolute responses.

- The Stem of a True/False question should be written as a statement of fact, not a question (see example below)
- Avoid words that can signal the correct response. 'None', 'never', 'always', 'all', 'impossible' tend to imply false. 'Usually', 'generally', 'sometimes', 'often' tend to imply true.
- Avoid lifting statements from course materials/lecture notes etc so that recall alone is not used to give the correct answer.

Examples (incl. from Ref1)

Single, unambiguous question or statement

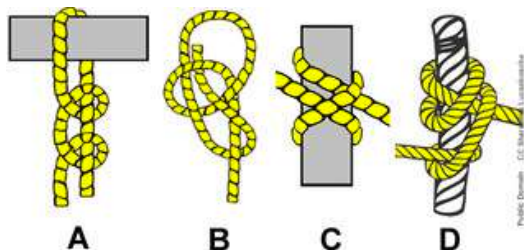
Which of the following nutrients are able to be used as an energy source by fish?

Select as many nutrients as you believe to be correct.

(Any number of answers, from 1 to 5, could be correct.)

- a) Carbohydrates
- b) Vitamins
- c) Minerals
- d) Proteins
- e) Fats

Scenario before the question



You need to tie your boat to a MOORING POST to unload items but quickly move on to the next job. The boat will be rocking up and down in the water.

Which ONE of these knots will you use?

Answer the question without having to read the options

Not like this!!

When mixed together:

- A. in equal quantities the colours blue and yellow make brown
- B. in equal quantities the colours blue and yellow make orange
- C. in equal quantities the colours blue and yellow make green
- D. in equal quantities the colours blue and yellow make red
- E. in equal quantities the colours blue and yellow make grey

(Also duplication of text in the Options, making this more difficult and time consuming to read.)

Better like this:

When mixed together in equal quantities, the colours blue and yellow make:

- A. Orange
- B. Brown
- C. Green
- D. Grey
- E. Red

Don't give clues in the text:

A corkscrew shaped hand tool used to take soil samples is an:

- A. bradawl
- B. spade
- C. auger
- D. pinch

Only AN auger completes the sentence correctly!

True/False question

True or False?

Dissolved oxygen levels can affect the FCR value.

The Options

These are:

- The **Key** – the correct answer
- The **Distractors** – the plausible incorrect answers

The Key

In a simple, one answer Multiple Choice question, there must be **ONLY ONE Key**, which is unquestionably correct.

The Distractors

Distractors must all be realistic and plausible, but definitely not correct! The best Distractors are the wrong answers that learners have come up with themselves in previous tests or question and answer sessions. Therefore an experienced teacher of the subject is likely to be the best source of good Distractors.

The idea of a 'wild card' or totally implausible Distractor is a myth. Such Distractors simply increase the likelihood of guessing correctly.

If you can only come up with two plausible Distractors, just use the two. A third one that would never be given as an answer to the question is of no value. But remember, if candidates have given a wrong answer before, even if it seems totally implausible to you, it is worthy of consideration as a Distractor.

Other important points about the Options (Ref 1)

- Options should be shorter than the stem, to avoid excessive reading.
- Options should each be of a similar length, if possible, but definitely in the same style and grammatical tense etc to reduce the possibility of guessing.
- The Options should relate grammatically to the Stem. If the Stem is a question, each Option answers the question. If the Stem is a statement, each Option completes the statement.
- Avoid giving a longer and more detailed correct answer!
- If the correct answer contains one or more key words that appear in the Stem, the Distractors should also include these key words. Otherwise, the correct answer is virtually a giveaway.
- Avoid 'All of the above' as a Distractor. If it is 'All of the above', use a Multi-answer Multiple Choice question type so that the candidate has to make this decision themselves. Otherwise, if the candidate recognises that another Distractor is incorrect, then 'All of the above' is also wrong. So, now they are down to a 50:50 chance of getting the question right.
- Don't use 'None of the above' as an Option. If it is the correct answer, then you still do not know if they have the required knowledge, only what they know it is not!
- Don't use 'always' or 'never' as, except in mathematics, these words may be hard to prove.
- Avoid 'perhaps', 'possibly', 'sometimes' or 'usually'. These mean that there isn't a definite answer. Objective testing can only test definite answers, not opinions. 'Usually' also tends to be used when the answer is true, so it is a giveaway.
- Make sure that the Options are mutually exclusive. If two Options have the same meaning but only one answer is to be selected, candidates will recognise that both must be Distractors.
- Mutually exclusive Options need to be considered carefully when providing 'ranges' of figures.
- Four or five Options are usually sufficient. It can be hard to think up more plausible ones. Set a high pass mark e.g. 70% or 80% to reduce passing by 'chance'.

Further notes about the question text (Ref 2)

- Only use negatives when absolutely necessary. If you do, make the word **BOLD** and/or block capitals to emphasise it. It is better to use a multi-answer multiple choice question to select as many correct answers as they consider correct than a multiple choice question where they select ONE that is NOT correct.
- Do not use technical terms that are not directly related to the skills and knowledge being assessed.

Providing feedback within the question

The process of adding feedback to each Distractor highlights whether that Distractor is plausible or not. Explaining why this answer is wrong focuses the teacher on the detail of that Distractor and can lead to its improvement.

Any objective test is a learning opportunity for the candidate, but particularly when it is used in a formative assessment. Not including feedback in this situation is an opportunity lost, for both the candidate and teacher. Media can be used to highlight errors, links to further study / previous notes can be added. Candidates are learning at the time that they realised they mis-understood something. All in all, it can be fertile ground! (see Example, page 22)

Take care with Summative Assessments, though. Feedback must not compromise the security and validity of the assessment, during and after the event. The effort to make the assessment must be repaid by being able to use it many times. VLEs such as Moodle allow for different opportunities for feedback. Socrative does not allow feedback to be used in certain quiz set-ups.

The Layout

The layout of each question influences how easily it is read by the candidate. Since the question is assessing a subject and rarely their reading skills, layout plays an important part in creating an effective question.

Layout of the quiz

- One question per screen is far less distracting than a 'scrolling' test. There is also less chance that questions will be missed.
- Each question should fit the screen and not require scrolling down to see some of the Options. This requires an appreciation of the screens and machines that will be used but in general you should plan for the dimension of laptop widescreen as this is generally your greatest limitation of height to width.

Layout of the Stem

- Line length on the screen should be around 8 to 12 words. Much more than this and the eye finds it difficult to keep track. Unfortunately widescreen laptops can allow for very much longer lines unless they are controlled e.g. by using tables. Not all software allows for this. All very good reasons for keeping the Stem succinct!
- Do not justify text (though you should rarely have enough text for this to be an issue!) The eye needs a ragged right hand edge to help it find its way through text.
- If an image is used in the stem, keep it to the left of the text or above the text. When the eye first meets a page it is drawn first to pictures. Then it will flow right and down to find the text (in the Western culture!). Images placed to the right of text or below it will require more effort from the reader to find the text. Sometimes, however, the nature of the question e.g. a target question requires the Stem above the image. Make sure the text is in **bold**, to help the eye find it more easily.
- An image within the Stem that is not intrinsic to the question itself has value to candidates at Further Education level and below. Used correctly, it can give a quick confirmation of context and can also simply make the page more interesting and engaging. This technique is of less or no value at Higher Education level and beyond.
- Do not use *italics* on screen – it is too 'jaggy' and undefined for easy reading.

Layout of the Options

- Keep the Options in a logical order
 - Ascending/Descending numbers/dates etc
 - Alphabetical order for single words of a similar length
- When the line length is not equal, lay out the Distractors with longest lines to shortest or vice versa so that they are as easy to read as possible. A jumble of different line lengths makes it more difficult for the eye to pick out the short ones. (See Example, page 24)
- For these reasons, Options should NOT be SHUFFLED

Examples

Grammatically related Stem and Distractors

Not so good:



What does this fin – circled in yellow - do?

Select one:

- a) Propeller
- b) Stabiliser
- c) Steering, braking, moving up and down

Better:



What does this fin – circled in yellow - do?

Select one:

- a) Propels the fish through the water
- b) Stabilises the fish while it's swimming
- c) Used in steering, braking, moving up and down

Avoid greater detail in the right answer/maintain key words in both stem and distractors

How does the Atlantic Salmon find the correct freshwater tributary in which it was hatched when returning as an adult from the sea?

Select one.

- a) By sensing changes in water temperature
- b) By visual recognition of river bed structures
- c) By visual navigation using the moon and stars
- d) By use of the lateral line to sense pressure changes
- e) By olfactory recognition of the tributary's water chemistry

This is the correct option. The 'giveaway' is that it is the only one that includes the detail of the key word 'tributary' (and also technical term 'olfactory')

Mutually exclusive Options

What is the OPTIMUM TEMPERATURE RANGE for marine cage farmed Atlantic Salmon feeding and growth?

(Assume fish stocks are healthy and dissolved oxygen levels are 100% saturation)

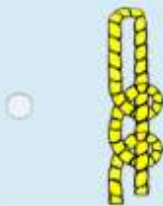
Select one:

- ☐ Above 21 °C
- ☐ 19-21 °C
- ☐ 14-18 °C
- ☐ 9-13 °C
- ☐ 4-8 °C

Feedback opportunities

Identify the BOWLINE knot.

Select one:

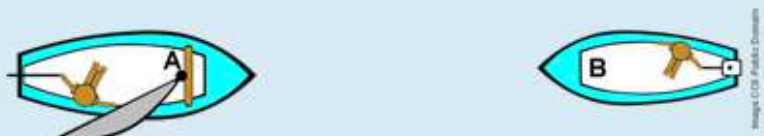


- This is a Sheet Bend. This knot joins two lines together. It is useful for joining lines of different diameter.
- The bowline knot is used to make a loop in the end of a line.



Feedback about a wrong selection

Layout of the Stem



Boat A is a sailing vessel. You are in charge of powerboat B.

The boats are on a head-on collision course.

What action should each boat take?

Select one:

- ☐ You should both give way, turning your boats to port.
- ☐ You should both give way, turning your boats to starboard.
- ☐ Maintain your course, sailing boats give way to power boats.
- ☐ Boat A maintains course. You should give way, turning your boat to port.
- ☐ Boat A maintains course. You should give way, turning your boat to starboard.

Layout of the Options: logical order

What is the feed rate for a stock of Atlantic Salmon averaging 500 grams with the water temperature at 12°C?

Refer to the feed table provided.

- a) 0.71 %
- b) 0.87 %
- c) 0.97 %
- d) 1.03 %
- e) 1.33 %

(Numerical)

What is the name of the organ highlighted?

- a) Heart
- b) Kidney
- c) Liver
- d) Spleen
- e) Swim bladder

(Alphabetical)

Layout of the Options: readability

What is the primary function of fats in manufactured fish diets?

Select ONE

- a) To provide an energy source
- c) To provide a source of pigments
- b) To provide a stabiliser in food pellets
- d) To provide resources for muscle growth

Shortest to longest line length

b). Technically sound

There are three aspects to this:

- It must be completely clear in the question what is expected of the candidate, e.g the marking system and so on
- The marking by the software must be set up correctly to reflect the question
- Could the questions be improved?

Clear instructions

What is the OPTIMUM TEMPERATURE RANGE for marine cage farmed Atlantic Salmon feeding and growth?

(Assume fish stocks are healthy and dissolved oxygen levels are 100% saturation)

Select one:

- ☐ Above 21 °C
- ☐ 19-21 °C
- ☐ 14-18 °C
- ☐ 9-13 °C
- ☐ 4-8 °C

Make sure the question is clear by making it bold text. Block capitals emphasise the focus of the question.

In this example, the question software confirms that the candidate has to 'Select one' answer. The convention is also to have radio buttons to select. (The software does this automatically.)

Where the software does not confirm that one answer is required, or if the quiz has several question types within it, confirm what is being looked for in the wording of the Stem.

For example: Which ONE of the following fish stocks would consume the highest percentage of their own biomass in food?

Emphasise the instruction ONE by using block capitals and/or bold.

Which physiological factors influence the feeding activity and growth rate of fish?

Select as many as you believe to be correct.

(Any number of answers, from 1 to 5, could be correct. Marks taken off for wrong answers.)

Select one or more:

- ☐ Size
- ☐ Health status
- ☐ Smoltification
- ☐ Flesh pigmentation
- ☐ Sexual maturation

Here the candidate has to 'Select as many as you believe to be correct' and, to confirm the nature of the question, it also adds that '1 to 5 answers may be correct'.

The convention for this type of multiple choice question is to have square selection buttons. This is automatically formatted by the software.

Marking system

Socrative and H5P allow for Multi-answer Multiple Choice but these are effectively All or Nothing questions, with no recognition of partially correct responses.

Moodle has the Partially Correct scheme as standard (and 'All or Nothing' as a plug-in).

However, be careful with Partially Correct. Make sure that WRONG answers are not worth nothing, otherwise simply selecting everything will always give you the full mark, even if not everything is correct! Take marks off for wrong selections and include this information in the question itself so that the candidate knows the rules.

From the following list of minerals, select the TWO that are needed in fish diets in the HIGHEST quantities .

(Marks taken off for wrong answers.)

Select one or more:

- ☐ Iron
- ☐ Iodine
- ☐ Sodium
- ☐ Calcium
- ☐ Phosphorus

Ensure that the instructions in the question software match your instructions in the question. For example, Moodle's standard software text for Multi-answer Multiple Choice is: 'Select one or more'. If you say Select 2 options in the question, Moodle's standard 'instruction' will cause confusion. A more generic text 'Make your selection' needs to be programmed into the software.

Could the questions be improved?

A VLE such as Moodle collects statistics from question results and allows you to analyse the quality of your questions.

Even without such a system, some checks can be made to improve the quality of your questions:

- Facility Index
- Analysis of response to each Option

The more candidates complete the question, the more reliable these analyses are. At least 100 results are required to get a reliable indication.

Facility Index

The **Facility Index** is the percentage of candidates who got that question correct. It shows how difficult the question is:

F I	Interpretation	F I	Interpretation
95 -100%	Extremely easy	21 – 34%	Moderately difficult
90 – 94%	Very easy	11 – 20%	Difficult
81 – 89%	Easy	6 – 10%	Very difficult
65 – 80%	Fairly easy	5% or less	Extremely difficult or something wrong with the question
35 – 64%	About right for the average learner		

(Ref 5)

If you are randomly pulling out questions from a Bank of similar questions, then the Facility Index will help to confirm that the questions in each bank are fair and there are not hard questions and easy questions within the same Bank. Randomising from Banks is a useful way to reduce 'copying' and 'cheating' in assessments.

Analysis of response to each Option

Fish Fins

PREVIOUS

BACK TO RESULTS TABLE

FINISH

2 Name the fin that is highlighted.



zoom

HOW'D WE DO? 2/2 students answered

A	Caudal	0%
B	Dorsal	0%
C	Pectoral	0%
D	Pelvic	100%

SHOW EXPLANATION

From Socrative

In this example, both learners chose the same, wrong answer.

<p>What is the OPTIMUM TEMPERATURE RANGE for marine cage farmed Atlantic Salmon feeding and growth?</p> <p>(Assume fish stocks are healthy and dissolved oxygen levels are 100% saturation)</p>	
Question statistics	
Attempts	5
Facility index	60.00%

Analysis of responses			
Model response	Partial credit	Count	Frequency
Above 21 oC	0.00%	0	0.00%
19-21 oC	0.00%	0	0.00%
14-18 oC	100.00%	3	60.00%
9-13 oC	0.00%	2	40.00%
4-8 oC	0.00%	0	0.00%
[No response]	0.00%	0	0.00%
Back to main statistics report page.			

Multiple choice question statistics from Moodle

<p>From the following list of minerals, select the TWO that are needed in fish diets in the HIGHEST quantities .</p> <p>(Marks taken off for wrong answers.)</p>	
Question statistics	
Attempts	5
Facility index	58.00%

Analysis of responses				
Part of question	Response	Partial credit	Count	Frequency
569	Iron	-20.00%	0	0.00%
570	Iodine	-20.00%	3	60.00%
571	Sodium	-20.00%	0	0.00%
572	Calcium	50.00%	5	100.00%
573	Phosphorus	50.00%	2	40.00%
Back to main statistics report page.				

Multi-answer multiple choice statistics from Moodle

Here, only 2 people (40% of class) got the whole question correct. The Facility Index (58%) takes account of the fact that all made at least one correct selection.

The **frequency that a distractor is used** is an indication of validity. After a large number of attempts (e.g.100) if a Distractor is never selected then it should be replaced.

An examination of the frequency of wrong answers being selected can indicate target areas for teaching or improvements in teaching. In the second Moodle example above, although the numbers are still small, you may begin to wonder why candidates are selecting Iodine as a correct answer.

Discrimination Index and Efficiency

The **Discrimination Index** in Moodle shows how effective the question is at sorting able learners from less able ones. Low and negative values indicate that the question is very poor or has an error in it. Such values result from the learners who generally get questions correct getting this question wrong.

A Discrimination Index of 30 – 50 shows adequate discrimination. Above 50 is very good discrimination (Ref 5)

Low and negative values for the **Discriminative Efficiency** recorded in Moodle also indicate questions to check for 'technical soundness'. A zero Discriminative Efficiency occurs when everyone got the question right – i.e. there is no discrimination between poor and good learners through this question. You are aiming for values greater than 50%. (Ref 5)

Notes on uploading to the question software

1. Preparing pictures

Make sure that you are working within the Copyright laws!

Pictures should be as small a file size as possible for the dimensions of the picture that you require. This keeps memory requirements down and upload speeds as fast as possible.

Some software does this for you as you add the picture to the site.

Otherwise, you will need to prepare your pictures before adding them into the software and make them in the dimensions you require. This is much better than trying to resize once they are in the software (the picture looks smaller but is in fact still the same file size so slowing down the upload time for the page and using up memory.)

You should get to know what your software/VLE is doing with images and what image resolution is required (usually 72 pixels per inch – ppi)

2. Direct import of questions from Microsoft Word/Excel

Moodle

Simple, one answer Multiple Choice questions can be uploaded into Moodle from a Word document converted to plain text. Specific formatting and layout is required. They are imported using the Aiken format.

Text files of 'Embedded answers' and of 'Missing word format' can also be imported using their specific format options.

All are limited in their layout and images cannot be imported. The title of the question is created from the text, which is not ideal. But if you have many questions of these types, importing them this way is worth considering. You need to plan ahead: only questions of the same type can be in the text file.

To find out more, view the demonstration below:

<https://youtu.be/iLPVsQJYjzk>

Socrative

Socrative provides an Excel template for uploading a quiz, though this is only for multiple choice questions or open ended questions. True/False and Short Answer cannot be uploaded this way. Images cannot be uploaded through the template.

Again, if you have many multiple choice questions to import, the template may be worth considering. Plan this from the outset, as the team's development document should make the use of the Excel template a time-saver!

3. Microsoft Word pasted into Moodle/VLE/software

Word does a good job as a tool for the development of questions. However, when it comes to uploading to an online platform, Microsoft Word brings with it a lot of extra and unnecessary formatting that can upset the layout of Moodle and other software pages. It needs to be converted to Plain Text (.txt). Many applications have their own conversion to .txt now built in to save you a lot of time and trouble.

For example, when your questions created in Word are pasted into Moodle use the 'Paste from Word' icon. If they are coming from other software to be pasted into Moodle, use the 'Paste as Plain text' icon.

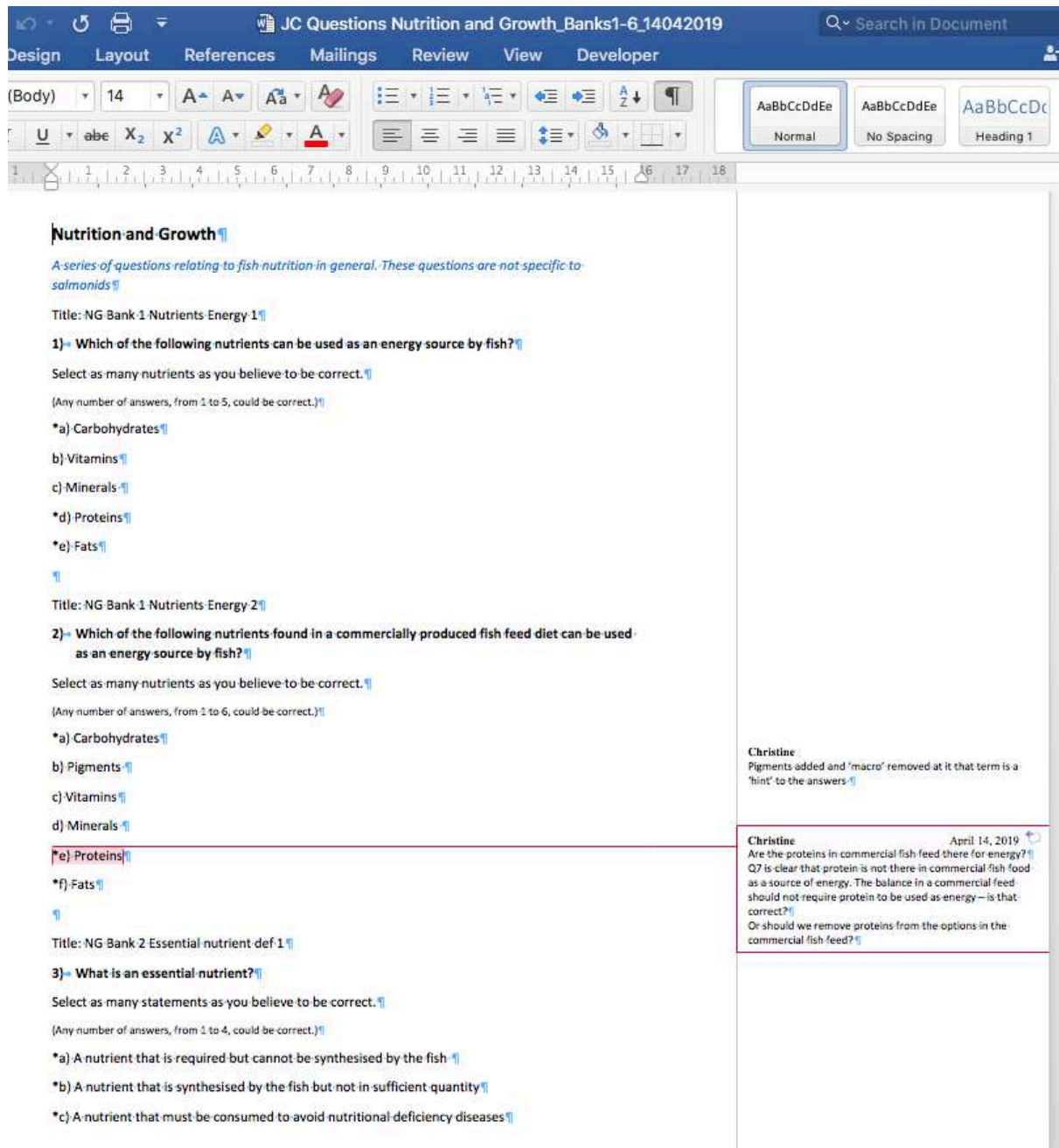
- Check the software that you are using.
- Never paste straight from Word.
- If necessary you may need to use the 'TextEdit' or 'Notepad' programme to convert to plain text before pasting.

Comparison of question types in Socrative and Moodle

The processing capacity of mobile phones and tablets are much smaller compared to the computers. Due to this it is different type of questions that cannot be processed on a mobile device. The table below provide an example of the variation between one response system and one VLE.

Question Type	Present in Socrative	Present in Moodle
Multiple choice (Select one answer)	✓	✓
Multiple choice (Multi answer, marks taken off for wrong answers)		✓
Multiple choice (Multi answer, All or Nothing)	✓ (limited)	✓
True or False	✓	✓
Select missing words (drop down boxes)		✓
Short answer -Type in the answer	✓	✓
Two or more questions in one (Embedded answers)		✓
Drag and drop words into text		✓
Drag and drop onto image		✓
Drag and drop markers/target		✓
Drag and drop text / images to create a sequence		✓
Matching		✓

An example of a question development format in Word



* indicates correct answer

- Word files are duplicated and renamed with the current version before fresh work and feedback begins. Feedback and notes are made through the 'Comments' so they can be explained and followed.
- Questions on the same topic and of the same 'weighting' of difficulty are placed in the same Bank.
- Each question has a unique name or 'title' for recognition, including in software such as Moodle.
- Questions themselves are numbered through formatting as a numbered list so that questions can be easily added, moved and removed.

References used in the development of this Guide

1. COLEG (2005), COLA Project Writing Objective test Assessment Items
2. SQA (Scottish Qualifications Authority) (2003), SQA Guidelines on Online Assessment for Further Education
([https://www.sqa.org.uk/files_ccc/GuidelinesForOnlineAssessment\(Web\).pdf](https://www.sqa.org.uk/files_ccc/GuidelinesForOnlineAssessment(Web).pdf))
3. SQA (2017), Guide to Assessment
4. <https://www.sqaacademy.org.uk>
5. Phil Butcher (The Open University), Brief Guide to the Moodle iCMA Reports
6. https://docs.moodle.org/36/en/Quiz_statistics_report

Appendix 3

Getting started with EVAL as a teacher

Registration

To get access to the service you need to register a user account. Registration is a 2-step process:

1. Register your account at <http://iqvet.stimuli.no:8080/service/registration.jsp>
2. Contact us on raoul.p.pein@hist.no to obtain teacher privileges for your account (this is needed to create and run evaluations).



Downloading and installing Eval

In order to create and run evaluations, you need to install the Eval software on your computer. This is done by following this procedure:

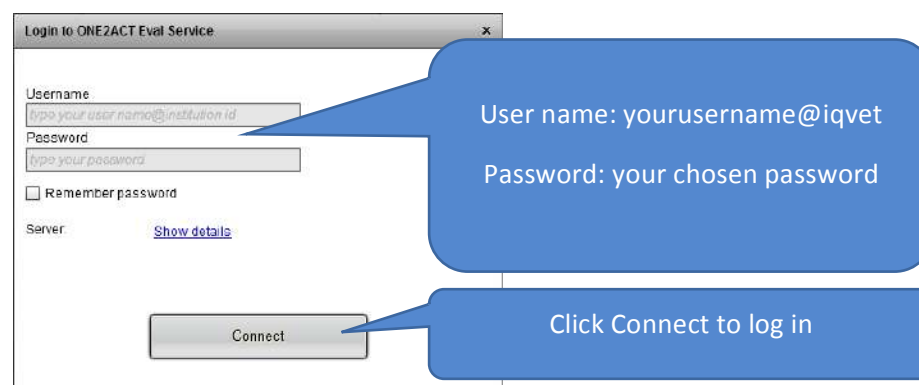
1. Check that the computer you're going to install the software on meets the technical requirements specified on page 88. Teacher client
2. Install the Adobe AIR software from <http://get.adobe.com/air>. Adobe AIR is a supporting framework which needs to be installed before Eval can be installed
3. Download the latest stable teacher application from <http://update.stimuli.no:8080/autoupdate/iqvet/stable/get.jsp>

Logging in to Eval

Once Eval has been installed, there will be a desktop icon called "Eval". Double-click this to start Eval.

The icon for Eval looks like this:  or 

You will then be asked to log in, as shown in the screenshot below.



Login to ONE2ACT Eval Service

Username
type your user name@institution id

Password
type your password

☐ Remember password

Server: [Show details](#)

Connect

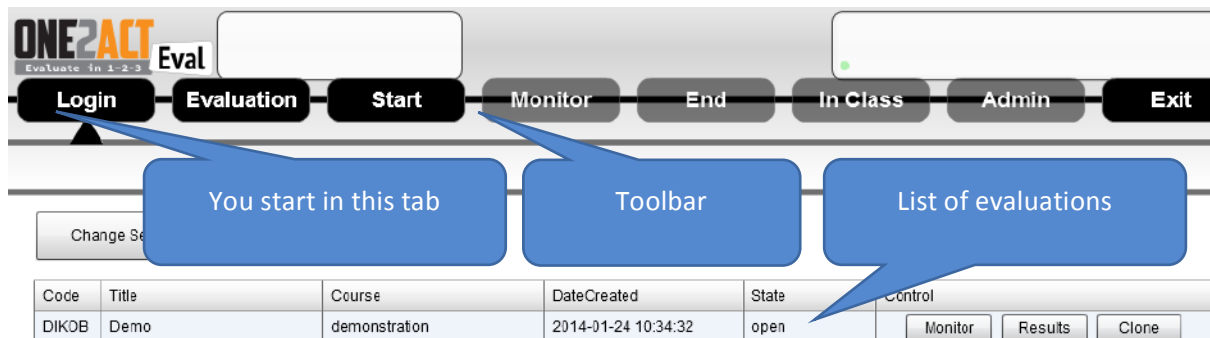
User name: yourusername@iqvet

Password: your chosen password

Click Connect to log in

Managing evaluations

Once you're logged in, you will see a list of your current or previously run evaluations or evaluations (this list will be empty the first time you log in) – this is shown below:



In the coming sections, we will explain the functions of each of the buttons in the toolbar at the top.

Creating evaluations

To create an evaluation from scratch, click the **Evaluation** button in the toolbar at the top to get this menu:



1. Click the **Create** button to start creating an evaluation from scratch. You will then get this dialogue box, in which you enter the relevant metadata of your evaluation, such as title and welcoming message:

The screenshot shows the 'Create Evaluation Wizard' dialog box. It has tabs for Metadata, Size, Rules, and Questions. The 'Metadata' tab is selected. The form contains the following fields:

- Evaluation name: Demo
- Course (Used to sort evaluation codes in categories): DEMONSTRATION
- Teacher description (Not shown to the student): This is a reminder of why the evaluation was runned, the idea and what was evaluated.
- Message to the students on start page: Welcome and good luck!
- ☐ Allow anonymous users

A 'Next >>' button is at the bottom right.

This message will be shown on the welcome page when people log on to your evaluation

Tick this box if you want to allow anonymous users (this means that users don't have to log in to answer your evaluation)

- Click **Next** to proceed to the next section, shown in the screenshot below:

Create Evaluation Wizard

Metadata Size Rules Questions

Number of questions: 7

Number of alternatives*: 4

*You can later delete or add alternatives for each question

<< Previous Next >>

Set the number of multiple-choice question in your evaluation (more can be added later). Other question types (e.g. likert) can be added later.

Set the default number of alternatives on each question (this can be changed later)

- Click **Next** to proceed to the next section, as shown below:

Create Evaluation Wizard

Metadata Size Rules Questions

☐ Allow bleeding If you allow bleeding, the negative score for an individual question will influence the overall score.

☐ Unlimited Choices Check this option to allow students to select any number of alternatives

Correct choice: 1.00

Wrong choice: -0.50

No choice: 0.00

SRS weight: 1.00 i.e. (Total Score = Evaluation Score + 1.00xSRS score)

<< Previous Next >>

Bleeding makes tests more difficult, by enabling accumulation of negative points)

Unlimited Choices lets learners select any number of alternatives

Scoring rules

Designate weight to SRS questions (if applicable)

- Click **Next** to get to the final page before the evaluation is ready for upload:

Edit setup for: My course - Course evaluation

Properties Questions

Indicate correct answers for each question to complete setup

No.	Alternatives	Rules	Score
1	a b c d	<input checked="" type="checkbox"/> Standard rules	Min: 0.00 Max: 0.00
2	a b c d	<input checked="" type="checkbox"/> Standard rules	Min: 0.00 Max: 1.00
3	a b c d	<input checked="" type="checkbox"/> Standard rules	Min: 0.00 Max: 0.00
4	a b c d	<input checked="" type="checkbox"/> Standard rules	Min: 0.00 Max: 0.00

Standard rules:

☐ Allow Bleeding

☐ Unlimited Choices

Correct alternative: 1.00

Wrong alternative: -0.50

No selection: 0.00

SRS score weight: 1.00

Minimum Score: 0.00

Maximum Score: 1.00

Simulate

Finish

- You can now add or delete questions, and also set the correct answer on multiple choice questions, as indicated in the figure above.

You can change the ordering of the questions by dragging questions up or down.

The scores from the rules do not apply to the Likert type questions that do not have a correct or wrong answer.

Adding text to the questions

You can add text to both the questions and the alternatives – the text entered will show up on the learners' devices when the answer the evaluation.

Click on the question number to get the following dialogue box:

Editor for question 3

Prompt

What is your most important motivator for this course?

Alternatives

a To do well in the tests

b To interact well with the rest of the class

c To learn new skills

d None of the above

Save Cancel

Enter question text

Type in text for the alternatives

Type in text for the alternatives

Types of questions

When you click the button **Click here to add new questions**, you will get a list of the available question types that can be added:

Multiple choice

Rating scale (Likert)

Open text

Use this for factual or right/wrong questions

Rating scale (also known as a Likert scale), used to indicate degree of agreement/satisfaction etc.

Open text answers

Multiple choice: this will add a multiple-choice question, which can be manipulated in the usual way:

5

a b c d

Standard rules Min: 0.00 Max: 0.00

Indicate correct answer by ticking the alternative(s).

No. of selectable choices: 0 Delete

Rating scale (Likert): these questions let users indicate on a scale the degree of agreement with a statement, or satisfaction with an aspect of a course etc. A Likert question looks like this:

6

More alternatives can be added with the +/- buttons. To change the text of the alternatives (here: "Agree", "Partly agree" etc.), click on the question number, and edit the text of the alternatives:

Editor for question 6

Prompt
Test results are a very strong motivating factor for me.

Alternatives

a Agree

b Partly Agree

c Partly Disagree

d Disagree

Save Cancel

Open text question: this type of question lets learners write short text answers, as shown below:

3

☒ Standard rules Min: 0.00
Max: 0.00

[Delete](#)

Like with the other question types, you can type in the question by clicking the question number:

Editor for question 3


Prompt

Saving and loading evaluations

Once the evaluation is set up correctly, you can save it to a file, so that it can be easily re-used.

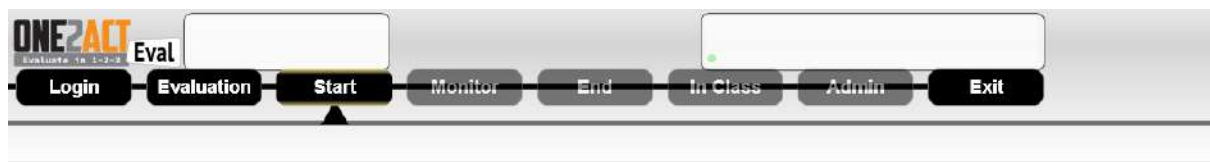
- To save an evaluation, click the **Save** button on the top toolbar. The evaluation can now be saved to a file in a designated location on your harddrive.
- To load an evaluation, click the Load button after clicking the **Evaluation** button used to set up an evaluation.

Uploading an evaluation to the server

Once the evaluation is set up, the evaluation can be uploaded/activated by pressing the  button at the bottom of the evaluation editing page.

*Note: the **Finish** button will be greyed out until you have set a correct answer on all the multiple-choice questions.*

You will then get this screen, asking you to confirm the upload of the evaluation:



Evaluation ready, upload?



Press the **Start** button to confirm the upload.

Monitoring the evaluation

Once the evaluation has been uploaded, a session code will be generated, and you will be taken to this screen, which is used to monitor the activity:

ONE2ACT Eval **UISAM**

Number of logged in students **3**

Submitted 0.00% (0) :

First Name	Last Name	User ID	Questions
student1		student1	
student2		student2	
student3		student3	

The view above is called the monitoring matrix. Click on the **Show results summary** to get a graphical overview of how the learners answer:

Current section: default

Submitted 0.00% (0) :

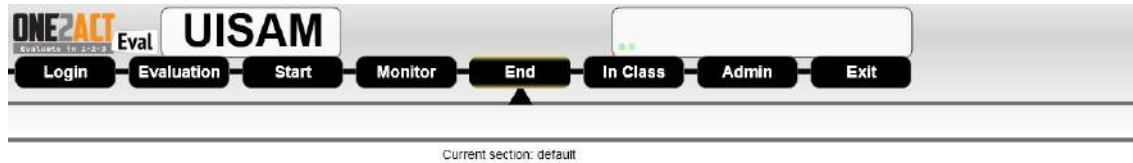
No	Type	Unan...	Answ...	Corre...	V...	Percentage bar	Marks
1	1	0 (0.00%)	3 (100.00%)	1 (33.33%)	2 (66.67%)	<div><div></div></div>	0 (0.00%)
2	1	0 (0.00%)	3 (100.00%)	1 (33.33%)	2 (66.67%)	<div><div></div></div>	0 (0.00%)
3	2	0 (0.00%)	2 (66.67%)	1 (33.33%)	1 (33.33%)	<div><div></div></div>	0 (0.00%)
4	2	0 (0.00%)	1 (33.33%)	2 (66.67%)	1 (33.33%)	<div><div></div></div>	0 (0.00%)
5	2	0 (0.00%)	2 (66.67%)	1 (33.33%)	1 (33.33%)	<div><div></div></div>	0 (0.00%)
6	2	0 (0.00%)	2 (66.67%)	1 (33.33%)	1 (33.33%)	<div><div></div></div>	0 (0.00%)

To go back to the default view, click the **Show monitoring matrix** button.

Ending the evaluation

You can end the evaluation at any time using the **End** button in the top toolbar. Once the evaluation is ended, learners can no longer submit answers.

You will be asked to confirm the closure of the test by pressing the Stop button shown below:



Pressing stop will prevent students from delivering more results.

You will then be taken to the results summary page:

ONE2ACT

Evaluate in 1-2-3

Eval

UISAM

...

Login

Evaluation

Start

Monitor

End

In Class

Admin

Exit

☐ Select All

Invert selection

Reopen default section

Current section: srs

Default Section

Select	No	Type	Results						Percentage bar	Marks
			Unan...	Ans...	Corr...	Wrong	Posit...	Nega...		
<input type="checkbox"/>	1	1	0	3	1	2	-	-	<div><div></div></div>	0 (0.00%)
<input type="checkbox"/>	2	1	0	3	1	2	-	-	<div><div></div></div>	0 (0.00%)
<input type="checkbox"/>	3	1	0	3	2	1	-	-	<div><div></div></div>	0 (0.00%)
<input type="checkbox"/>	4	1	0	3	1	2	-	-	<div><div></div></div>	0 (0.00%)
<input type="checkbox"/>	5	1	0	3	2	1	-	-	<div><div></div></div>	0 (0.00%)
<input type="checkbox"/>	6	0	0	3	-	-	2	1	<div><div></div></div>	0 (0.00%)

You can re-open the evaluation by clicking the **Reopen default section** button.

Reviewing the results with the class

After the evaluation is ended, you can review the results in class.

1. Select the questions you want to include in the review phase by ticking the relevant questions, as shown below.

ONE2ACT Eval UISAM

Login Evaluation Start Monitor End In Class

1 2 3 4 5 6

Select All Invert selection Reopen default section

Select	No	Type	Unan.	Results	Percent
<input checked="" type="checkbox"/>	1	1	0		0 (0.00%)
<input checked="" type="checkbox"/>	2	1	0		0 (0.00%)
<input checked="" type="checkbox"/>	3	1	0		0 (0.00%)
<input checked="" type="checkbox"/>	4	1	0		0 (0.00%)
<input checked="" type="checkbox"/>	5	1	0		0 (0.00%)
<input checked="" type="checkbox"/>	6	0	3		0 (0.00%)

Tick questions here

These buttons will appear, corresponding to the questions you select

2. You can click the **In Class** button in the top toolbar – this will hide most of the interface out of view, which makes the screen less cluttered, and you have full control over what will be shown to the learners. The screenshot below shows what the interface looks like when the In Class mode is activated:

ONE2ACT Eval UISAM

Login Evaluation Start Monitor End In Class Admin Exit

Ad-hoc SRS 1 2 3 4 5 6

Look at

2

<< >>

Percentage

Histogram

To SRS

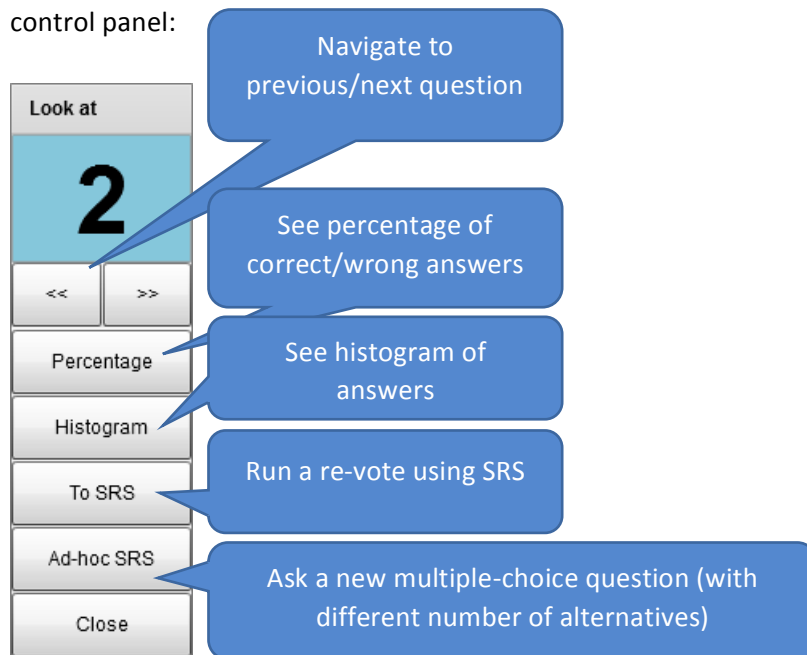
Ad-hoc SRS

Close

Most of the interface is made transparent

All results are hidden, unless you explicitly want to show them

3. To have a closer look at e.g. question No. 2, click the **2** button. You will then get this control panel:



- The **Percentage** and **Histogram** buttons can be used to let the class know how the other learners responded.
- The **To SRS** button can be used to run the question again, using the built-in SRS facilities
- Ad-hoc SRS can be used to run a new question – with different question text, and different alternatives.

Asynchronously running evaluations

In some cases the evaluations need to be run for a group of people that will not be working on them in the same time and place. The trainer can create an evaluation and upload it to the server and start it. Afterwards he can send to the participants an email with the address for the learner client, the session code and other instructions.

When creating such evaluations it is important to add the text for the questions and the alternatives as the participants need to have all the required information on the device so that they can answer.

The learners can answer partially the evaluation and then continue it from where they left it by logging in to the same session.

The teacher can connect to the evaluation as many times as she needs to see the progress of the participants. When the time to end arrives the teacher needs to connect to the evaluation and hit the **End** button.

Leaving the evaluation running

Unless you explicitly end the test using the **End** button, the evaluation will be open indefinitely. This means that you can set up an evaluation that will be left open for some time – e.g. running a post-course evaluation which is kept open for one week after a course.

Note that exiting the Eval client does NOT stop the evaluation – you have to manually end it.

Reconnecting to an open evaluation

You can reconnect to an evaluation that you left open after you've logged in to Eval:

ONE2ACT Eval UISAM

Server: 2.5.0.8
Client ONE2ACT Eval Ver:0

Code	Title	Course	Date	Status	Control
BAGEJ	Course evaluation	my course	2014-01-14 08:40:45	open	Monitor Results Clone
UISAM	Course evaluation	my course	2014-01-14 09:02:09	open	Monitor Results Clone
TONEY	After-course evaluation	my course	2014-01-14 10:27:48	open	Monitor Results Clone
KAXIH	Post-course evaluation	my course	2014-01-14 10:34:54	open	Monitor Results Clone

Tips and tricks

Text on mobile

When adding text to the questions, keep in mind that the users might respond with a rather small screen. Keep text short and to the point.

Verifying

It is a good idea to verify your tests before actually running them in order to spot potential problems. For this bit it is always handy to use the **Save** and **Load** evaluation features.

Errors

There are a lot of reasons that might cause errors. If you get lots of errors it might be that your network connection is down. Always check if you can access the internet and the server (try loading <http://iqvet.stimuli.no>). Sometimes it might help to just restart the teacher client and try again. If you send an error report make sure you send all the possible details in the comments.

Reporting problems

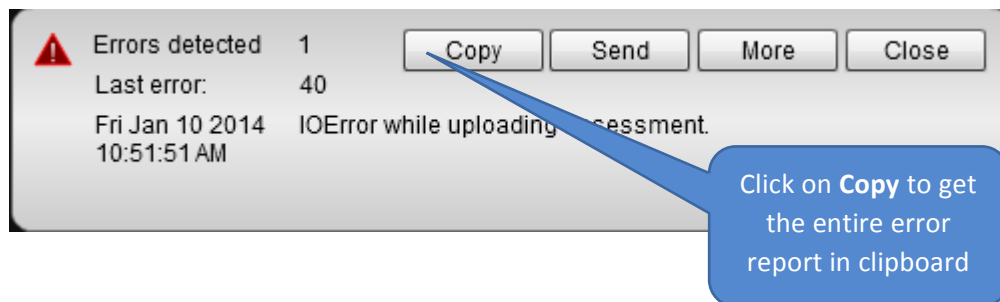
When errors and exceptions are occurring a notification usually appears in the top right corner of the screen.

One can expand the notification by clicking **More** to get more details. Usually the information there is very technical and intended to be sent to the developers.

Click **Copy** to get the error report into the clipboard. This is useful when there are a lot of errors and the report is really large. This is the recommended way to get the error reports. Afterwards just paste this in an email message and send it according to the instructions

When clicking **Send** the application will attempt to open the email client with the error report already prepared and you just need to add your comments and send the message. This operation is not guaranteed to always open the email client (it depends on the email client you have and the size of the report). When this fails, use **Copy** to get the error report.

The error report includes information about where to send it.



Important: You should always add comments to your bug reports. Describe the best you can the context in which the errors occurred. The most important information is how one can replicate the problem.

The learner client

The learner client, which the learners use to answer your evaluation, is entirely web-based. This means that it will run on any mobile device with a web browser and internet access.

At the time of writing, the Eval learner client is compatible with the following web browsers¹:

- Google Chrome
- Safari
- Android Browser
- Opera

Registering and logging in

1. The learners answer your evaluation by accessing the following web page:
<http://iqvet.stimuli.no>. They will then get a web page like the one below:

The image shows two screenshots of the iQVET mobile app interface. The left screenshot shows the 'Enter login data' form with fields for Session, User name, Password, and a Remember checkbox. The right screenshot shows the same form with the Login button highlighted by an arrow. Below the form, there are buttons for 'User account control', 'Switch app', and 'About'.

2. If you enabled anonymous login for your evaluation, the learners can access your evaluation by typing the following:
 - a. The session code for your evaluation
 - b. User name: guest
 - c. Password: guest

¹ For a full list of compatible browsers, please refer to the web page http://en.wikipedia.org/wiki/List_of_web_browsers#WebKit-based.

3. If only registered users can participate, and they haven't already created an account, they need to do so by clicking the **User account control button**, and then select **Register new user**, as shown in the figure below.

Register user

First name

Last name

eMail

User name

Password

Retype Password

All fields are required

Register

4. Once the learners have registered, they will be taken back to the login page where they log in using their chosen credentials.
5. Once logged in, the learners will get the welcome page:

Welcome

Session: KAXIH

Course: my course

Thank you for participating in this evaluation!

Please press the start button.

Start

This is welcome message you typed in when you created the evaluation

6. By pressing the **Start** button, the learners can then start answering the evaluation, starting directly on question 1:

1 2 3 4

Question 1: 1 answer

1. What is your educational background?

Primary school ✓

Secondary school ✓

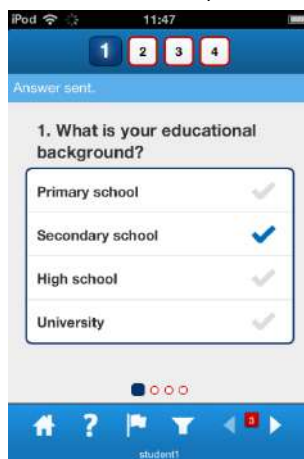
High school ✓

University ✓

student1

Here both the question and the alternatives have text written into them

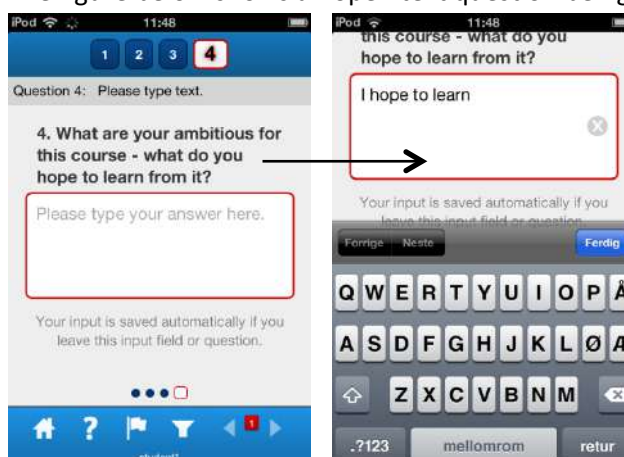
7. As a visual indication that a question has been answered, a blue checkmark appears, and the frame turns blue, as shown below.



8. To go to the next question, learners can either slide their finger over the screen (the “swipe” gesture) if using a touch screen; or use the arrow keys in the lower right corner, or by pressing the numbered buttons at the top.
9. The figure below shows what a likert question looks like for the learners:



10. The figure below shows an open text question being answered.



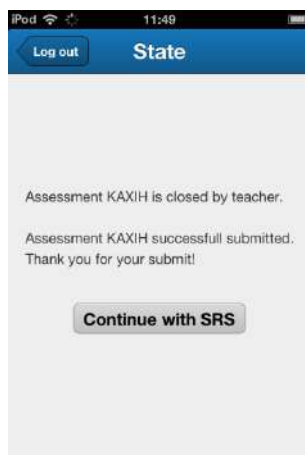
11. Once all the questions have been answered, a green submit bar will appear at the top of the screen, as shown below:



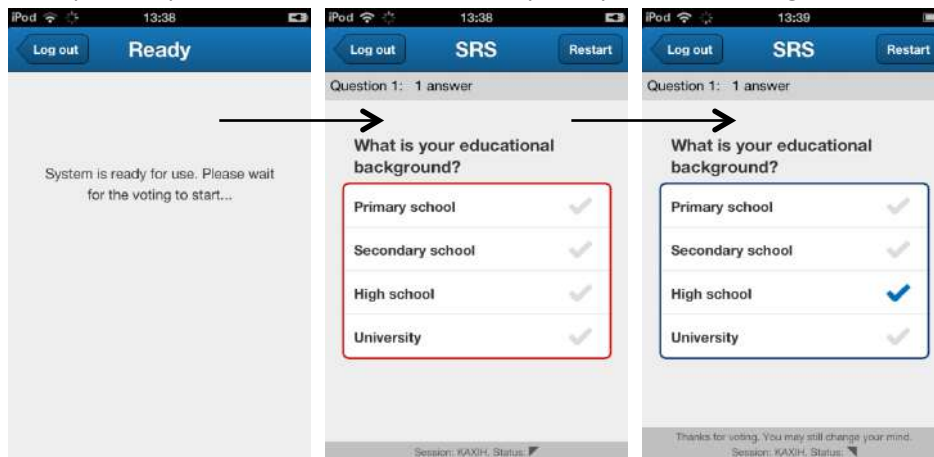
12. To start the submit process, in which the learner finalizes the evaluation, they either click on the green bar, or the home icon in the lower left corner. They will then be asked to confirm their answers, as shown in the figure below.



13. As a confirmation of a successful submit, the learners will be taken to this page:



14. The button **Continue with SRS** is used if SRS sessions are run after the evaluation (for example if a question was misunderstood by many learners during the evaluation).



Requirements

Teacher client

To run the teacher client the recommended and officially supported platform is Windows.

Fully supported operating systems: Windows® XP (SP3), Windows Vista® (SP2), Windows® 7 (SP1), Windows® 8 (on other operating system, eg. Mac OS, Linux some features may not be available)

- Processor: Intel® Core®2 Duo E6700 @ 2.6 GHz or better, AMDT AthlonT64 X2 6000+ @ 3.0 GHz or better
- RAM: 2 GB Windows® XP / 4 GB Windows Vista®, Windows® 7, Windows® 8.
- HDD space: 5 MB
- Sound card and speakers
- Mouse or other pointing device
- Internet access
- Adobe AIR must be installed before installing the teacher client

Learner client

- PC, Mac, tablets, smartphones and other devices with internet access
- A WebKit-compatible browser is required (eg. Google Chrome, Safari, Android Browser)
- Internet access (by wire, wireless network or 3G/4G mobile data connection)

Other requirements:

- Ensure that the wireless network type and capacity can handle simultaneous connections from the devices used by the audience. As a general recommendation, keep in mind that every user may possess several devices which require internet access, so some overhead should be taken into account
- The minimum upload/download bandwidth per user should be 5 Kbps or better