

ABSTRACT

The aim of this project is to create an **interactive e-learning** resource, and investigate its utility in specialist training compared to the conventional PowerPoint lecture method. Using the software 'Xerte', our design will consist of **interactive** activities and diagrams, adapted from currently available teaching resources. Following evaluation of questionnaire feedback and satisfaction from trainees in Wales deanery, the final product could be utilised to inform a shift in the teaching curriculum of basic ultrasound principles. We aim to improve confidence in hands-on ultrasound in trainees with a more efficient method of learning and improve patient satisfaction.

Key words: Obstetrics, Gynaecology, interactivity, ultrasound training, e- learning

BACKGROUND

- Ultrasound training is a fundamental skill for practicing obstetricians, and has been incorporated into the Royal College of Obstetricians and Gynaecologists (RCOG) curriculum 2019 (Royal College of Obstetricians & Gynaecologists, 2019). Transabdominal examination of early pregnancy has been outlined as a mandatory component of specialist ultrasound training in the UK, essential to high-quality patient care.

Issue

- Doctors in training may face limited ultrasound training availability for hands-on practice based on capacity for training provision in each trust/healthboard in U.K (Hughes & Rajesh, 2021).
- The aim of this project is to design, distribute, and evaluate an efficient and interactive e-learning resource to all the trainees in Wales for basic ultrasound principles, compared to conventional lecture-based method in fig.1. Conventional lecture-based methods lack performance assessment, and flexibility required in learning retention (Sait & Tombs, 2021). Blended learning uses the “flipped” or “inverted” classroom in medical education. Covid restrictions and limited trainer availability prompted the conception of this learning tool. Previous study by the author showed lack of engagement by participants if the e-learning module lacked an interactive element and was not mandatory component of training.
- The wider aim is to improve trainees' core understanding (Millers pyramid), to enhance confidence and increase training time for hands-on ultrasound, and therefore improve patient outcomes.

RESULTS AND DISCUSSION

Results

- 18 trainees completed the resource. Scores were based on a 10-point Likert scale and scores were given before and after completing the resource to assess confidence, usability, and usefulness in each section.
- Changes in confidence scores before and after using the module were not significant ($p=0.0889$ for basic ultrasound physics and $p=0.1338$ for using the ultrasound machine).
- Mean scores for usefulness and usability of e-learning and interactive components were ≥ 8 in each section.

Limitations

- Lack of robust objective assessment before distribution of e-learning tool.
- Different teaching methods in hospitals may impact confidence levels in comparing before and after.
- Accessibility of authoring tools for content creation of e-module

Conclusions

- Overall positive response with regards to utility, accessibility
- Cognition and learning must be the guiding and driving force rather than technology for creation of e-learning module. Reducing cognitive overload and including learner Interactivity, assessment and certification are desirable features while considering implementing a blended approach of training in ultrasound education.

METHODS

Design of e-learning resource: Use of 'Xerte' software and andragogical principles over 8 weeks. Components include videos, interactive diagrams, labelling activities (see fig.4) and flashcards. The resource can be accessed via the QR code in fig.3 below.

Content: Adapted to include the theoretical components of basic ultrasound training curriculum. Each section includes a recap quiz, to reinforce key principles of retrieval practice..

Section 1: The basic physics of ultrasound.

Section 2: Identifying and explaining parts of the ultrasound machine.

Section 3: Identifying structures and stages of early pregnancy (< 10 weeks).

Data collection:

Questionnaire will be distributed to trainees under NHS guidelines, and ethical approval via Google Forms. Questionnaire to be taken after using e-learning resource.

Data analysis

Mann-Whitney U test with SPSS software to analyse quantitative questions. Qualitative data (open-ended and yes/no questions) analysed in SPSS by deriving themes and will be presented in bar charts

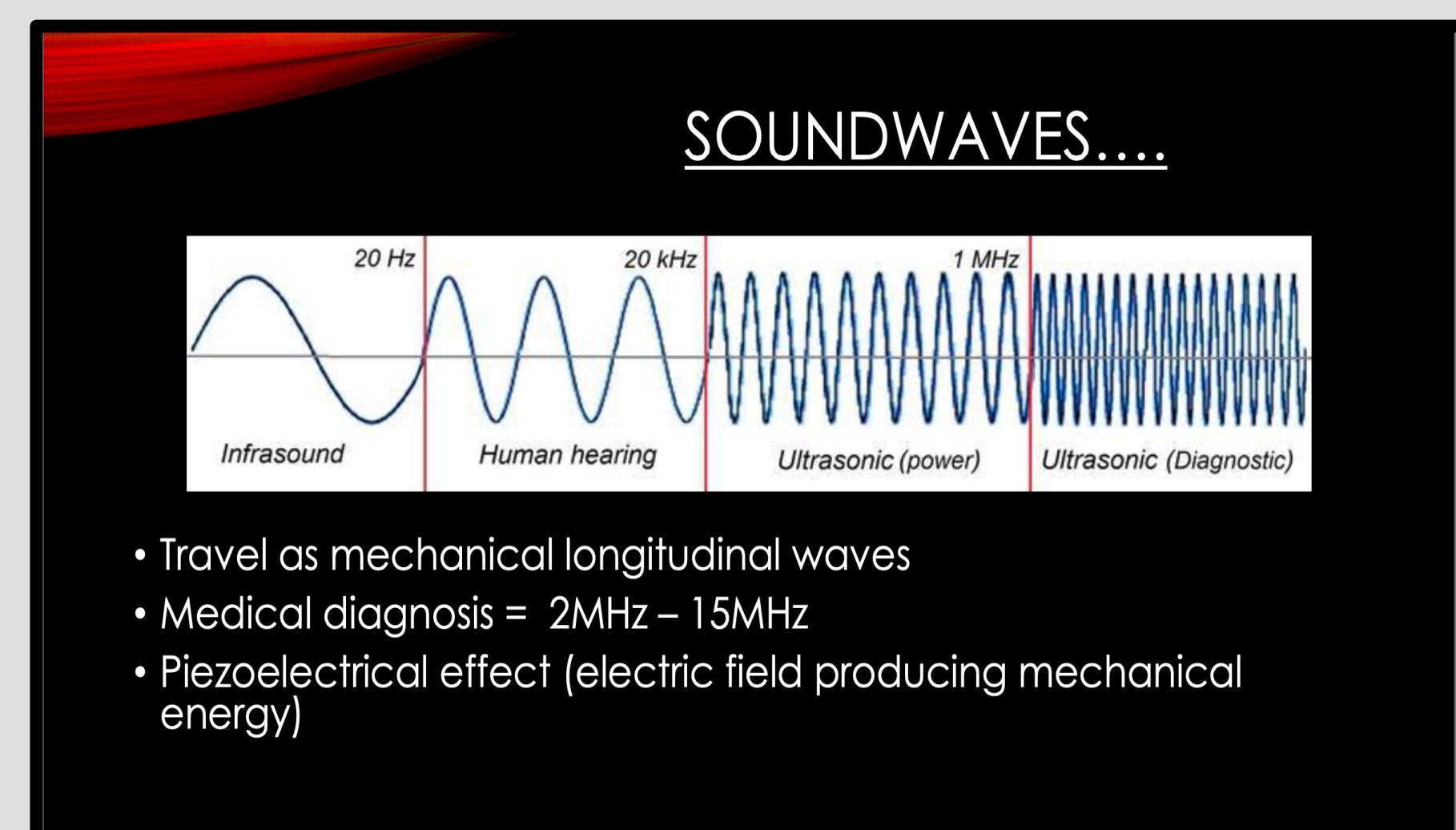


Figure 1: Example of PowerPoint slide in current teaching of basic physics component (A.Condell, personal communication 2018).



Figure 3: Title page in the e-learning resource, with QR code link to the full resource (Rajesh, 2021).

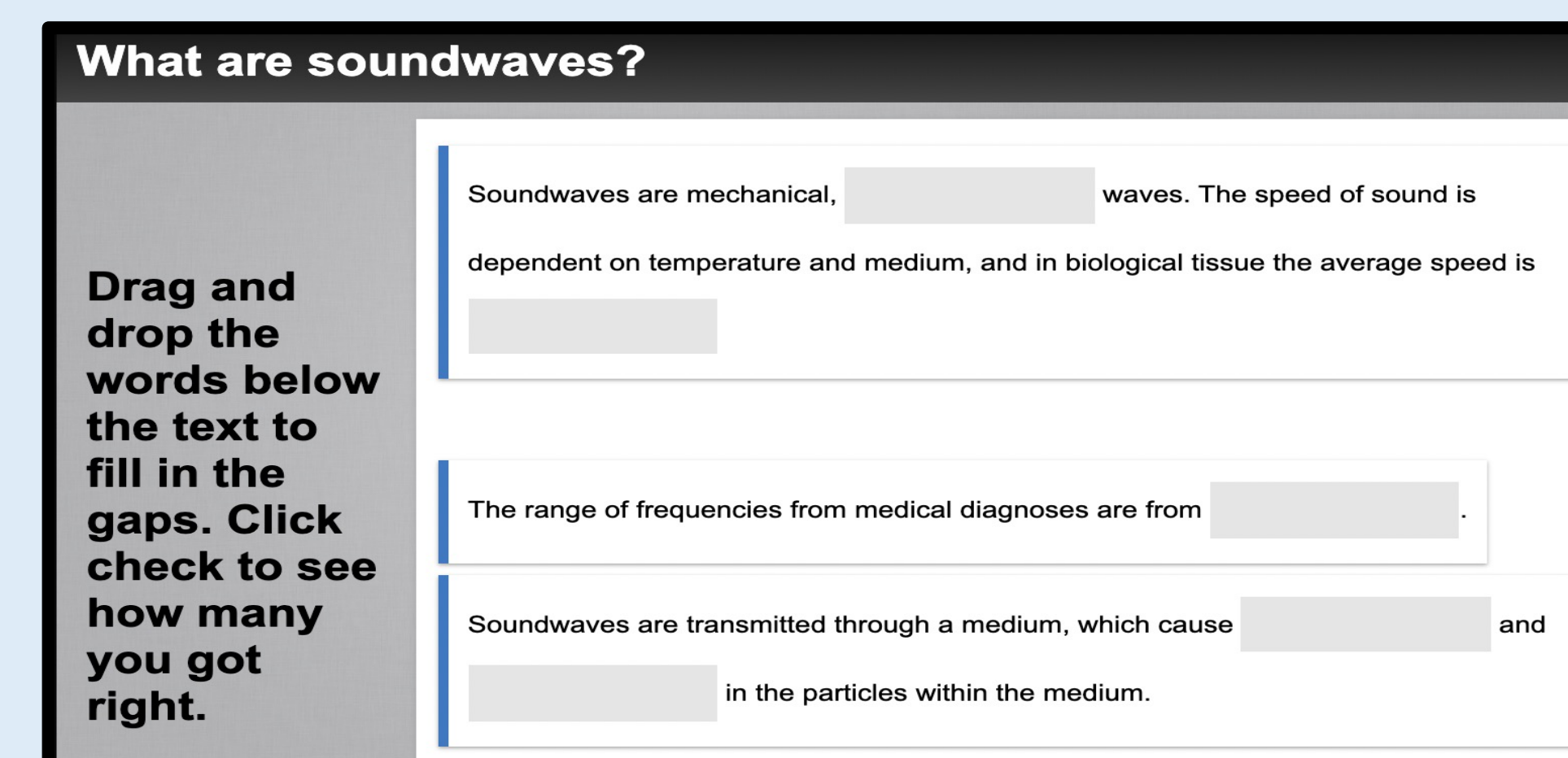


Figure 4: Example of interactive drag and drop activity from e-learning resource, covering the same physics content as fig. 1.