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**Information technology in a global society**  
**Higher level and standard level**  
**Paper 2 – article**

Monday 18 November 2019 (morning)

1 hour 15 minutes

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**Instructions to candidates**

- Do not turn over this sheet until instructed to do so.
- This sheet contains the article required for information technology in a global society higher level and standard level paper 2.

## Theme: Health

### IT system: Virtual reality simulators

Students at the Medical University of Mokopane, South Africa who wish to become surgeons\* must currently undergo training that involves:

- observing experienced surgeons operating on real patients
- practising basic surgical techniques on dummies
- 5 • carrying out simple parts of the surgery on real-life patients under the very close supervision of experienced surgeons.

Dr Elisa Gerber, the principal surgeon at the university, is working with *Virtual Surgery Solutions* (VSS) to develop a virtual reality (VR) simulator that would recreate the experience of carrying out surgery. Dr Gerber and her team are performing the final tests on the six different surgery  
10 simulations that will initially be available at the university. These simulations will use a variety of hand controls designed by VSS.

The VR simulator includes a headset with a screen that displays a single, 360 degree computer-generated image in three dimensions (3D), and has hand controls for the trainee surgeon to use (see **Figure 1**). Audio instructions are provided for the trainee surgeon to follow, and the system  
15 also has sensors that gather data from the trainee’s head and hand movements. Senior surgeons can watch the progress of the trainee on a monitor in real time.

**Figure 1: Trainee surgeon using the VR simulator**



[Source: image courtesy of 3D Systems]

During the training, screen capturing software is used to record the virtual surgery performed by the trainee surgeon so it can be analysed later by the trainee or a senior surgeon. Dr Gerber can see great potential for improving the quality of the surgical training in her hospital with the VR  
20 training system. She also believes that sharing the video recordings generated during the training sessions could benefit other hospitals in southern Africa.

[Source: © International Baccalaureate Organization 2019]

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\* surgeons: doctors who specialize in performing medical operations

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