This contains the list of the supplementary files and their purposes.

1) **NoteBook_ML** directory contains multiple files, there are as follows:

a. **df_ready.csv** is the file that was used to train the facial training model, it contains Action unit, head pose, eye gaze. This csv file was obtained from the DAISEE dataset (see section 3.1.1) after the videos were processed in OpenFace. Please note the columns regarding the head pose location in x,y,z with respect to the camera in millimetres were discarded due to feature selection (see section 3.1.2).

b. **AR1.csv,AR2.csv,AR3.csv** – is the dataset that was obtained during the experiment. It contains the action unit, head pose, eye gaze of the students using the AR application. This was inputted into the machine learning model to obtain the student's engagement level.

c. **preRecordedVideo1.csv, preRecordedVideo2.csv, preRecordedVideo3.csv** – is the dataset that was obtained during the experiment. It contains the action unit, head pose, eye gaze of the students learning via pre-recorded video. This was inputted into the machine learning model to obtain the student's engagement level.

d. **videocall1.csv, videocall2.csv, videocall3.csv** – is the dataset that was obtained during the experiment. It contains the action unit, head pose, eye gaze of the students learning via video calls. This was inputted into the machine learning model to obtain the students' engagement level.

e. **File1.ipynb** is the Jyper Notebook file that contains the code which was used to train and test the model. It also contains code that was used to optimise the hyperparameter and also predict the student's engagement level.

f. **GradientBoostingClassifier** is the actual machine learning model that was used to classify the student's engagement.

2) **NoteBook_eye** directory contains multiple files, there are as follows:

a. **df_eye.csv** is the file that was used to train the SVM model in the eye blink rate program. This csv file was obtained from the Talking Face dataset (see section 3.2.5).

b. **SVC_model_Eye_Blinking_Trained_Model_Eyeblink8** is the trained SVM model

c. **TalkingFaceEyeBlink_Jypter.ipynb** is the Jyper Notebook file that contains the code which was used to train the SVC_model_Eye_Blinking_Trained_Model_Eyeblink8 model using the df_eye.csv file

3) **EyeBlinkDetection** directory contains multiple files, there are as follows:

a. **eye_blink_threshold_Use.py** is the actual eye rate measuring program that was ran to measure students eye blink count. It classifies eye blinks using the threshold(naïve approach). It processes real-time video via webcam. This can be ran using the command: "python eye_blink_threshold_Use.py --shape-predictor eye_predictor.dat"

b. **eye_blink_threshold_Test.py** is the eye rate measuring program that was ran to measure eye blink count in the Talking Face dataset (see section 3.2.5). It also classifies blink using the threshold(naïve approach). This is different to **eye_blink_threshold_Use.py** as it processes video from the directory (i.e this does not process live webcam video). This can be ran using the command "python eye_blink_threshold_Test.py --shape-predictor eye_predictor.dat –video talking.avi"

c. **eye_blink_svm_test.py** is the eye rate measuring program that was ran to measure eye blink count in the Talking Face dataset (see section 3.2.5). It also classifies blink using the trained SVM model. It processes video from the directory.

d. **SVC_model_Eye_Blinking_Trained_Model_Eyeblink8** is the SVM model for classifying the participant's eye state (i.e blink). This can be ran using the command "python eye_blink_svm_test.py --shapepredictor eye_predictor.dat --video talking.avi"

e. **Talking.avi** is the actual dataset on which the eye blink was tested.

f. **eye_predictor.dat** is the dlib model which was trained using iBUG 300-W dataset (see section 3.2.1)

4) **Teaching_material** directory contains multiple files, there are as follows:

a. **KS2_APK_build.apk** is the AR application which was used during the experiment to teach Group 1. Please note this application is optimized for the Acer 10" tablet and has not been tested on other devices. Thus, there is a chance that the text 'might jump around'.

b. **ImageTarget** director contains all the image target for the AR objects.

c. **preRecordedVideo.mp4** is the video that was used to teach Group 2.

d. **slide_show.pptx** is the PowerPoint that was used to teach the participants in group 3 during a video call.