Currently, the development of information technology has grown very rapidly. It provides positive improvement in all sectors, includes education. E-learning and multimedia streaming technologies which allow people to communicate each others through notebook or computer bu using VoIP, have been replaced the conservative teaching process, that requires face to face meeting. Moreover, these technologies are open source, where the users can develop according to their own needs.

Two open sources are used in this undergraduated thesis to create a real-time online learning system, such as Moodle and BigBlueButton. Moodle is an open source online learning system which has a very good performance to facilitate teachers and students to share materials and references, discussion, and conduct online classroom activities. In order to provide the real-time process, BigBlueButton is added and integrated into Moodle. BigBlueButton is an open source web conferencing system which supports VoIP technology and create a virtual classroom, such as sharing presentations with other users, send messages between users, as well as sharing audio and video from a microphone and web camera users. In addition, this undergraduated thesis also facilitates the users with low internet access to be able to run their
E-Learning process by automatically adjusting the web camera video quality.

Based on the experimental results, it shows that the teacher are able to manage the course and make reservations for virtual classroom that can be followed by the students who join the course. Then, the teacher or student who wants to share a video from a web camera, will get compression value of web camera based from their own speed of internet access. On the test of a web camera compression value, the system success to adjust the web camera compression value when located at a speed of 0-6 Mbps to 50% from its original quality, 6,1-7,5 Mbps to 70% from its original quality, and more than 7,5 Mbps to 90% from its original quality. In the test of the server capacity, the system uses 36 % of the total memory to run and push the memory of the server which runs up 82 % to handle 20 users. System uses the bandwidth up to 68 Mbps to handle 20 users when using the features of virtual class optimally.

Keywords: E-Learning, Multimedia Streaming, Voice over IP, Dynamic Compression, Open source, Moodle, BigBlueButton