The University of Northern Iowa has one of the largest Teacher Education programs in the nation. Dr. Benjamin Forsyth, Department Head of Education Psychology and Foundations is conducting eye-movement research to help expert and novice teachers become the best they can be.

While pursuing a degree in Physics from Brigham Young University, Dr. Forsyth developed a desire to become a teacher and added a teaching certificate to his resume. Through this process Dr. Forsyth was introduced to the psychology of teaching and learning, and this intriguing topic eventually led him to Michigan State to obtain his PhD in Educational Psychology.

Dr. Forsyth, a cognitive scientist, studies how the mind works and especially how learning occurs. Cognitive scientists approach understanding how the mind works by drawing upon many fields of knowledge such as psychology, linguistics, education, philosophy, computer science and artificial intelligence. Eye tracking technology assists Dr. Forsyth in his research of how a person learns.

Eye tracking is a sensor technology that is able to determine exactly where eyes are looking and focusing. Using the person’s pupil, “glint” of her eye, and a lot of mathematics, the program is able to follow the path of the eye. It can determine where the eyes go, what they see, and what they stop to focus on. It can also determine if the eyes go back to look at something again. What a person focuses on provides insight to her thinking.

Dr. Forsyth uses two types of eye trackers. The first one is the Tobii T60. It is a computer screen with small cameras imbedded into the screen to watch and record eye movement. This is useful for studying how different groups of people respond to educational videos, marketing research, and much more.

Recently, Dr. Forsyth acquired the Tobii Pro Glasses which is a wearable eye tracker. The glasses have six sensors that track everywhere the user is looking. The Tobii Pro is a portable device. It has a battery and data storage pack, so information can be obtained in almost any situation and location. It records the eyes and what they are looking at simultaneously. The software can measure pupil dilation, which is another marker of how much the user is thinking about the subject she is focusing on.

Past research in the teaching profession has relied on self-report by the teacher. This is asking the teacher what she saw during a particular time. However, what we remember is influenced by our experience and beliefs which can alter what we think we saw. For example, a real-estate agent will view a home differently than a burglar will for the same exact house. The real-estate agent will notice aspects of the home that will help it sell or have some interest to clients. The burglar will look for the best way to break in. What we remember is also affected by time. Sometimes what a person says she saw may not be as accurate or give the full picture compared to the eye tracker.

Eye-tracking data can be combined with biometric responses such as EEG’s or galvanic skin tests. The electroencephalogram (EEG) tracks and records brain waves. Galvanic skin tests measure the responses of the skin, such as sweat, and is often used in lie-detector tests. This additional information shows researchers many different bodily responses to situations.
or ideas. The biometrics can be studied to give more in depth information. The researcher is able to compare the simultaneous information of brain waves, skin response and what the eye is focusing on for the same activity. The researcher may see what part of the brain is active or how a person feels when focusing on a subject or situation.

However, Dr. Forsyth is focused on the eye-tracking portion only. You may have heard the saying that the eyes are the windows to the soul, but Dr. Forsyth believes that the “eyes are the window to the mind.” By studying the eyes, we can get glimpses into the mind to better understand it. By better understanding the mind, people can become better teachers, motivators, and doctors. Not only can this research be utilized in teaching and marketing but also the medical field. Some researchers are using the technology to study patients with Alzheimer’s and dementia.

Dr. Forsyth would like to take this technology into the classroom. He would like to study the difference between a novice teacher and one who is more experienced, especially those who are considered some of the best in their fields. The current model shows that more experienced teachers will take in information quickly and without focusing on any particular activity for long periods of time, but still be aware and effective. Novice teachers tend to focus on problems or specific students and not notice what is going on in another area of the classroom. In learning more about this model, Dr. Forsyth can then try to break it and help new teachers become better prepared for the classroom setting. He wonders: Can the experienced teachers be trained to pick up more details in a situation? Can the novice teachers be encouraged to relax and notice other details around the classroom?

This is just the beginning of how the eye tracking technology can be used to understand people and their minds. UNI STEM will be tracking Dr. Forsyth’s progress with his research and follow where else it will take him and educators.