

New app helps children with 'lazy eye' visual impairment

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Bambu the panda races against Rob the robot. Credit: Nucleolus Software

Eye specialists, mathematicians and games designers at the University of Southampton have teamed up to develop and launch a smartphone app aimed at helping improve vital treatment for children with amblyopia, a common visual impairment, also known as "lazy eye."

Amblyopia causes sight loss in [young children](#), with around one in 50 affected. It occurs when the eye doesn't develop a strong enough link to the brain, but can usually be treated simply and successfully through occlusion or 'patching' therapy. This involves covering the unaffected eye for a set time—commonly three hours a day for six months—forcing the 'lazy' eye to work.

It's important children persist with the treatment, but this can mean a great deal of parent or caregiver intervention. The [success rate](#) for occlusion therapy is only 50 percent and experts say busy households "giving up," due to the time and effort involved, is a leading cause of failure.

Dr. Jay Self, associate professor of ophthalmology at the University of Southampton, and Consultant at University Hospital Southampton (UHS), explains, "Consistency in wearing an eye patch is essential for treating amblyopia. The technique works, but there's a short window of time for treatment, as it has very limited success after the age of eight. It requires a huge time investment and perseverance and is not much fun at all. Sadly, it's easy to give up."

"Preliminary evidence suggests that the development of immersive smartphone, tablet and computer games could offer an effective solution by making the child want to wear the patch for the first time. This can increase the effectiveness of occlusion therapy and importantly, help relieve some of the pressure on parents to implement the treatment."

The Southampton researchers have founded a spinout company, Nucleolus Software, and launched a [phone app](#) designed to encourage children to build a positive association with their eye patch and wear it more often. Together with the Southampton charity Gift of Sight, they are also running a national survey to help better understand the barriers to successful patch-wearing and how [game technology](#) can help.

The phone app consists of several different computer games designed by graduates of the University of Southampton's Winchester School of Art working at Nucleolus Software. Through complex programming, it also uses the smart phone's camera to check if the person playing is wearing their patch correctly and encourages them to do so within the game.

Mathematician Joerg Fliege, professor of operational research at the University of Southampton, explains, "By harnessing novel approaches from [computational mathematics](#) and [artificial intelligence](#) we have enabled the app to sense if the user's eye patch is being worn properly. If it isn't, the game prompts them to correct this by sending them encouraging messages. If they wear their patch properly the game responds by unlocking different levels, or can give rewards."

"We think motivating children in this way will help them to form a more [positive association](#) with their patch and ultimately, increase the effectiveness of their treatment."

A prototype of the app called [The Amblios Club](#) is now available for (selected) Android devices on the Google Play Store and is hoped to be available for iPhone devices in the coming months. In the games, children play with Bambu the panda and his robot friend Bob who both live in a nature reserve. They encounter other animals out in the wild and help Bob in the upkeep of the reserve and in recycling waste.

Games designer and senior lecturer at Winchester School of Art (WSA), Vanessa Wanick, comments, "By using games and Artificial Intelligence, The Amblios Club puts the kids in the center of the experience. By making eyepatch use a superpower, we expect that this becomes not just a fun element, but also an opportunity for kids to shine. The app also has a nurturing and goal setting scheme that gives children and their parents autonomy and control over the patching treatment.

"This approach resonates with ongoing research and teaching practices at WSA, in which we approach games as a critical tool, via a player-centric approach and unraveling the power of games beyond entertainment."

Provided by University of Southampton

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