Researchers propose best loot box model to maximize gaming profits

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Want a new outfit for your online game character or want to improve the odds of defeating a virtual enemy? Hand over a bit of real-world money for a virtual loot box and you can change the look of your avatar or gain

an advantage that increases your in-game performance.

In 2018, the gaming industry raked in more than $30 billion using a revenue model that lets players spend real-world money on a grab bag of virtual items. The items can range from cosmetic modifications for a character to those that are useful in game play, like weapons. Loot box sales are now a core source of revenue for many online games, but have caught the attention of regulators across the world, with some jurisdictions declaring the lucrative model a form of gambling.

With the growing popularity of loot boxes and increasing regulator attention, Ningyuan Chen, an assistant professor at U of T Mississauga's Department of Management, is examining the best way to price and design the multi-billion-dollar-a-year revenue mechanism.

The concept of loot boxes isn't new, Chen says, likening today's digital loot boxes to the packs of baseball cards children bought decades ago. While not new, virtual loot boxes are a controversial practice. Regulators are grappling with how to manage their increasing popularity, with many debating whether it counts as gambling. Chen says China has put a cap on how much an individual can spend in a day. Belgium banned loot boxes outright while other jurisdictions, like the United States, are currently looking into the issue.

Chen's colleague recently presented their paper on [loot box pricing and design](#) to the United States Federal Trade Commission, which held workshops about the issue.

Calling loot boxes innovative, Chen says he doesn't believe in banning them. They are a useful source of revenue for the gaming industry, he says, where free-to-play games still incur server-side maintenance costs.

Chen and his colleagues examined loot boxes from the perspective of the

seller, determining the best price and design to maximize profit. They looked at two models: traditional and unique. A traditional loot box, he says, would be similar to that found in the pre-digital age where a player can receive items they already own.

Unlike makers of baseball cards, though, the game industry knows what items customers already have in their inventory. That's where unique loot boxes come in. The items are still random, but they can be drawn from a pool of items the player doesn't already own, eliminating duplication.

"We found that the unique box can make more profit because the customer knows they will get something new so they're willing to pay more," Chen says, adding that unique loot boxes can bring in 30 percent more profit.

While Chen and his colleagues built an economic and mathematical model to determine the best pricing and structure for the loot boxes, they also had some advice for regulators. Loot boxes, Chen argues, are generally a good selling mechanism, but the gaming industry needs to be up front about the probability of gaining an item. He acknowledges the difficulty is enforcing the honest disclosure of the odds. One way to ensure firms are being honest is to have data sent to regulators for an audit, but that raises questions of consumer privacy, Chen says.

There are other factors that also need to be studied, Chen says, and he encourages the academic community to take the multi-billion-dollar gaming industry more seriously and study it more closely. In the meantime, Chen and his colleagues are looking to expand on their research and make direct connections to gaming companies, seeking a better understanding of loot box models.