Video content has become one of the most important uses of internet today. Most of the internet traffic constitutes of video streaming related traffic, and studies show that it will keep increasing in the future. With the development and improvements in technology, internet users expect higher quality, more enjoyment and all in all, a better experience from video streaming. This paper discusses how the quality of the video matter to user engagement, how different metrics of quality affect differently to user engagement and if similar metrics can be used to determine the quality of different video streaming platforms.

A 2-part special system is developed to collect data needed for this study. One part consists of an instrumentation library that resides on the client side and the other part consists of a data aggregation and processing side running on the server side. This system collects and processes data affiliated over a wide variety of end users, video content providers, ISPs and content delivery networks.

The study considers a set of metrics as criteria for measuring the quality of streaming. The *engagement metrics* describe user involvement and interaction in two levels: view level and viewer level. View level considers a user viewing a a single video continuously. Viewer level considers the number of viewers and total play time of all videos of a single streaming tool (a.k.a. viewer). The join time, buffering ratio, rate of buffering events, average bit rate and rendering quality are considered as the metrics for video quality. The collected data are classified into 3 categories. LongVoD: Videos with a length between 35-60 minutes, shortVoD: Videos of a length between 2-5 minutes and live videos. Live videos tend to differ from longVoDs because the client buffers are designed to minimize the lag no more than a few seconds from the source and all viewers are roughly synchronized in time.

After processing this data, an overview of the results shows that while most of the viewing sessions are enjoying good quality, there is an amount of views that suffer from quality issues that cannot be ignored. Hence content providers should take action to improve user experience and increase user engagement. To accomplish it we need to identify what metrics matter the most. In addition, we need to identify the relationships between quality metrics and engagement and how to quantify the *importance of a metric*. Quantifying the relationship between the engagement metric and quality metrics lets us understand if and how the quality impacts user engagement.

We find that buffer ratio has the highest engagement of all metrics and impact of other metrics depend on the content type. Join time and average bit rate has very low correlation with engagement in longVoD content. In contrast, average bit rate is more correlated in live content, because live users are more sensitive to buffering events than longVoD users. Analysis of user engagement in viewer level shows that the number of views and total play time are impacted by the quality metrics. The metrics that impact view level also impact viewer level engagement.

In conclusion, we see that buffering ratio is the most important metric across all content and genres and that join time becomes a vital aspect in terms of viewer level engagement. Content providers can make decisions based on these results to improve the quality of the content and increase user participation.