

Supporting Time-Constrained Student Sports Journalists: Smartwatch Flagging and Match Visualization for Better Interview Questions

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Abstract. University student sports journalists often face time constraints during post-match interviews, as they are responsible for photography, live updates, and reporting with limited support. As a result, they have little time to take notes or prepare thoughtful questions, which often leads to vague or superficial interviews. Through interviews with student journalists and evaluations involving athletes, we found that questions focusing on specific plays and tactics were perceived more positively by both groups. To address this challenge, we developed a smartwatch-based system that allows journalists to flag important scenes during matches. These flags can later be reviewed using a prototype interface that displays both match videos and time-series information. We conducted two user studies to evaluate the system. The first study confirmed that journalists could successfully use the flagging function under real match conditions. The second showed that reviewing flagged scenes helped journalists formulate more specific and meaningful questions. These findings suggest that the proposed system can support student sports journalists in improving the quality of post-match interviews, even under practical constraints.

Keywords: Sports Journalists · Fencing · Retrospection Support · Interview · Flagging

1 Introduction

University sports journalism plays an essential role in promoting the accomplishments of student-athletes and supporting the broader university sports culture. In Japan, many universities with competitive athletic programs maintain student-run sports media organizations. However, student journalists are often responsible for interviews, photography, and social media updates, which are typically handled by multiple staff members in professional media settings.

This multitasking often forces student journalists to cover entire matches alone, leaving little time to take notes or prepare interview questions. As a result, their post-match questions are often vague or generic and rely heavily on the athletes' responses instead of demonstrating a deep understanding of the match. Although student journalists play a central role in communicating sports

performance, their interview process remains understudied, especially in relation to how limited working conditions affect the quality of their interactions with athletes.

To better understand this problem, we conducted interviews with student sports journalists and examined how athletes perceived their questions. This dual-perspective investigation revealed the intense workload student journalists face and highlighted discrepancies between the intentions behind interview questions and how athletes evaluate them. These findings clarified key challenges in student sports reporting and informed the design of our support system.

To address these challenges, we realized the need for a method that enables journalists to reflect on the match based on scenes that caught their attention during the game. Our approach allows journalists to mark such moments while watching the match, and later review them using both video footage and time-series information to support question formulation. To ensure that flagging could be done quickly and unobtrusively during the match, we developed a smartwatch-based system that allows journalists to record scenes without interrupting other tasks.

We conducted two user studies to evaluate the effectiveness of the proposed system. The first field study confirmed that flagging with a smartwatch is feasible during real matches while fulfilling other reporting duties. The second study showed that reviewing flagged scenes through our visualization system helped journalists generate more specific and insightful interview questions.

The contributions of this study are as follows:

- We identified the practical challenges faced by student sports journalists through interviews and found that questions focusing on specific plays were rated more positively by both journalists and athletes.
- We proposed and implemented a smartwatch-based flagging and visualization system that enables journalists to efficiently review the match and prepare questions within a limited post-match timeframe.
- We conducted two user studies that demonstrated both the feasibility of in-match flagging and the effectiveness of the system in supporting the formulation of high-quality, play-specific interview questions.

2 Related Work

2.1 Interview Question Content

Several studies have analyzed the content of interview questions posed by journalists. Research analyzing interview cases across various countries points out that questions often lack focus or a clear scope, and there’s a deficit of follow-up questions based on active listening [3]. Furthermore, studies highlight biases in question content due to stereotypes; for instance, questions to Caucasian athletes often emphasize character and intelligence, whereas those to black athletes frequently focus on physical prowess and strength [12]. Also, gender stereotypes contribute to content bias, with male athletes often receiving

more performance-focused questions than female athletes [5]. This study aims to support the creation of well-focused questions by helping journalists extract specific scenes from a match and explore them in greater depth. It also implicitly encourages focusing on in-game performance, regardless of stereotypes.

2.2 The Influence of Media on Athletes

In interviews, both the questions posed by journalists and the resulting media coverage can affect an athlete’s mental state. A survey of 200 players in Iran’s football league revealed a significant correlation between media coverage and stress, and between stress and player performance [13]. Conversely, a case study of Saudi Arabia’s 2022 World Cup football team revealed media’s positive influence on player performance. An online survey of football fans indicated strong agreement that media coverage positively influenced the team’s performance [1]. Therefore, ensuring that interview questions closely reflect match events may contribute to better interview experiences for athletes.

2.3 Support for Journalists

Although there is limited research directly supporting the writing and interviewing processes of journalists, several notable studies have been conducted. Franks et al. [4] developed INJECTs, a search tool designed to help journalists generate new ideas for articles by recommending tangential information during their research. Their work demonstrated that this system broadened the scope of journalists’ articles. Similarly, Pamudyaningrum et al. [11] proposed a gamified approach to teach interviewing methods, focusing on aspects like question selection and ethical considerations. Their experiments showed that interactivity enhanced enjoyment and engagement. While these studies aim to foster the professional development of journalists, our research specifically aims to support journalists who face difficulties in current interview environments by providing direct assistance during real interview situations.

2.4 Fencing Play Data Analysis

Numerous studies have been conducted on the acquisition and analysis of fencing play data. Kevin et al. [17] proposed FenceNet, a system for automatically classifying footwork techniques. By inputting 2D pose data, the system performs action classification. Using a fencing footwork dataset, they trained and evaluated FenceNet, achieving an accuracy of 85.4% in classification. Nita et al. [9] measured the angular velocity of athletes’ bodies during play and revealed the potential to distinguish advanced players from beginners based on their ability to control their movements. Furthermore, by providing real-time visual and tactile feedback using lamp colors and smartwatch vibrations to indicate imbalances, they demonstrated the effectiveness of such feedback in enhancing athletic performance [10].

Other studies have also focused on acquiring and analyzing various play data in fencing, including joint angles [8], sword tip movements [6], and joint loads [2], which are expected to contribute to coaching beginners and providing feedback during training. In addition, many studies have explored visualizing play information, such as real-time visualization of sword tip trajectories superimposed on broadcast footage [14], and analyses of technical and tactical characteristics through graphical representations of footwork and other player movements [16].

While these studies demonstrate various methods for analyzing fencing play, their focus lies primarily on athletic performance analysis and coaching support, often relying on specialized equipment like multiple cameras. These data acquisition methods are not practical for journalists, especially university student journalists who often work alone and manage both photography and real-time social media updates. This gap highlights a critical need for a support system that minimizes the operational burden on journalists, allowing them to effectively capture relevant match information without disrupting their primary interviewing duties.

2.5 Flagging Methods Using Wearable Devices

Many studies have explored flagging methods, particularly in the context of Experience Sampling Methods (ESM), where wearable devices are often utilized due to their continuous wearability.

In a comparative study examining ESM logging using smartphones and smartwatches, it was found that participants recorded more entries when using smartwatches than smartphones. Additionally, the response time between receiving a notification and responding was shorter with smartwatches [15]. Another study involving smartphones, smartwatches, and smart glasses revealed that smartwatches received the highest ratings in terms of comfort. However, due to the limited screen size, some participants noted difficulties with precise touch operations, especially those with larger fingers. In terms of response rate, both smartwatches and smart glasses outperformed smartphones, which showed the lowest response rate. Furthermore, the response time following notifications was significantly shorter for smartwatches and smart glasses compared to smartphones [7].

These findings highlight the advantages of using smartwatches for data input in dynamic environments, particularly their ability to reduce the delay between intention and action, as well as their overall comfort [15, 7]. Such characteristics make smartwatches a highly suitable platform for developing flagging systems designed for journalists operating in demanding, multitasking scenarios. This review thus reinforces the rationale for utilizing smartwatches as the input device in our proposed system.

3 Identifying and Validating Interview Difficulties in Student Sports Journalism

3.1 Interview Challenges of Student Sports Journalists

To better understand the working conditions of Japanese university student journalists, we conducted interviews with one member from each of four university sports newspaper organizations. The results revealed that, due to chronic staffing shortages, journalists are often required to take on multiple roles simultaneously, such as photography and interviewing or writing articles. In fact, two of the four interviewees reported consistently working alone because their organizations lacked sufficient personnel. In addition to photography, some groups were also responsible for tasks such as real-time social media updates and video recording for platforms like YouTube.

As a result, many journalists said they were only able to document minimal information during matches, such as score changes. Some even noted they took no notes at all in order to focus fully on capturing high-quality photos. These findings suggest that, under current conditions, student journalists often lack sufficient reference material to ask meaningful post-match interview questions.

We also asked about the time available to prepare interview questions. Journalists who conducted interviews immediately after a match reported that the time between the end of the match and the start of the interview was too short to ask well-thought-out questions. During this period, they must manage various logistical tasks such as moving within the venue, packing up camera equipment, and posting social media updates, leaving little time for review or reflection.

This lack of breathing room means journalists often enter interviews without a clear grasp of what occurred during the match. In particular, same-day interviews suffer from limited preparation time and reference material. These insights highlight a need for support systems that enable quick and easy review of matches and key plays within the limited timeframe before interviews.

3.2 Interview Question Survey with Journalists and Athletes

To explore what kinds of interview questions are perceived as good or bad by journalists and athletes, we conducted a question evaluation survey involving both. Fencing was selected as the target sport, as the first author has four years of experience covering fencing and possesses relevant knowledge about play styles, match characteristics, and tactics.

The evaluation involved 109 interview questions created by two university student sports journalists while watching pre-recorded fencing matches on a PC. These questions were evaluated by the two journalists who created them and by three fencing athletes who participated in the corresponding matches. Journalists rated their confidence in each question on a 5-point scale. Athletes rated each question based on four criteria: ease of answering, clarity of meaning, perceived understanding of their play, and emotional response to being asked the question.

Table 1: Distribution of Question Evaluations by Players and Journalists

	Player High Evaluation	Player Low Evaluation
Journalist High Evaluation	48	9
Journalist Low Evaluation	28	24

For analysis, the average score across all items was calculated. Scores of 1.0 or higher were considered high evaluations, while scores below 1.0 were considered low evaluations.

Based on this classification, we compared athlete and journalist evaluations. Among the 109 questions, athletes gave high evaluations to 55% of the questions, while journalists gave high evaluations to 44%. Table 1 summarizes the distribution of high and low evaluations from both groups.

1) High Evaluation from Both Groups (48 questions): These questions typically addressed general tactical principles (e.g., “The first point is crucial; what were you focusing on?”), referred to previous matches or interviews (e.g., “You won this tournament last year; how do you feel about losing in the semifinals this time?”), or explored specific plays in depth (e.g., “On the 19th point, it looked like you skillfully dodged your opponent’s attack and landed a hit; what are your thoughts on that?”). Such questions were perceived as meaningful and well-targeted by both athletes and journalists.

2) Low Evaluation from Both Groups (24 questions): These included vague or overly abstract questions (e.g., “What are your thoughts looking back on the match?”), or incomplete questions that assumed implicit follow-up (e.g., “You were scoring smoothly up to the 44th point, weren’t you?”). Both sides found them difficult to engage with.

3) High Evaluation from Athletes, Low from Journalists (28 questions): These were often broad or general questions that were easy to answer (e.g., “How was your condition today?”) or addressed plays not seen as central to the match by journalists. Athletes still appreciated being asked about those moments.

4) Low Evaluation from Athletes, High from Journalists (9 questions): These questions often focused on negative performance (e.g., “Why did your opponent score three consecutive points?”) or asked for reflection on pressure situations (e.g., “What was your mindset with a 13-point lead?”). While journalists found these analytically useful, athletes found them difficult or uncomfortable.

The analysis revealed the following insights:

- Questions that explored specific plays or tactics were consistently rated highly by both athletes and journalists.
- Athletes’ evaluations were influenced not only by the question content itself but also by how well they performed during the referenced plays.

- Journalists’ evaluations were shaped not only by the question content but also by whether the answers aligned with the themes or storylines they intended to highlight in their articles.

4 Proposed Method

We propose a match review method that presents match videos alongside time-series play information to support university student sports journalists in formulating deeper interview questions immediately after a match. To enable effective review within the limited post-match time window, the method allows journalists to mark key moments during the match that they wish to revisit. These marks are recorded as “flags” and later used as anchors for retrospective analysis. Figure 1 shows the prototype system interface used in this study.

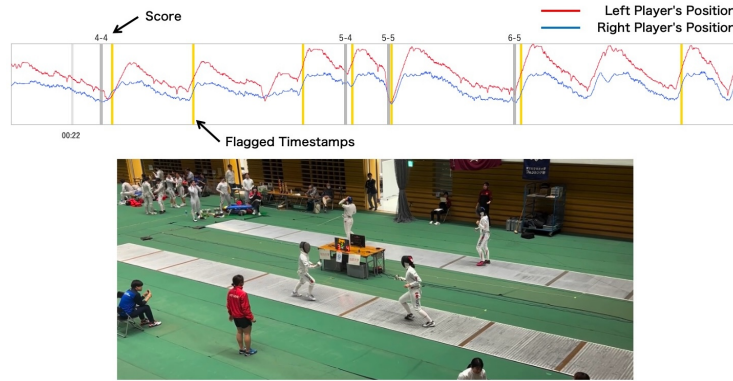


Fig. 1: Prototype interface displaying match video and time-series information. For fencing, the system visualizes player positions on the piste, which is critical for performance analysis.

Photography is one of the most demanding in-match tasks for student journalists and often involves using a DSLR camera with a telephoto lens. As a result, operating handheld devices such as smartphones is impractical during matches. Moreover, requiring visual attention to input flags increases the risk of missing critical moments, such as highlight plays or important reactions. Therefore, the flag input mechanism must support eyes-free operation and provide immediate confirmation through feedback.

To meet these requirements, we developed a smartwatch-based flagging application. The Apple Watch is worn on the wrist, allowing journalists to flag moments with a simple tap, without interrupting other tasks. The system offers both haptic and auditory feedback to confirm successful input. Journalists carry a paired iPhone during the match, which handles data storage and later access.

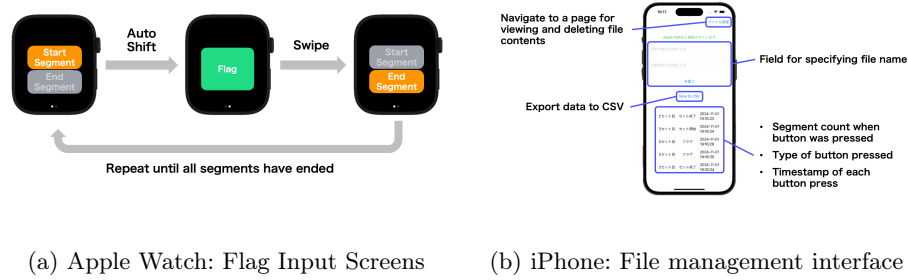


Fig. 2: Flag Input and Data Management System

The flagging application was implemented in Swift, along with a companion iOS application for managing and exporting flagged timestamps. Figure 2 illustrates the flag input and data management interfaces.

The prototype system for post-match review (Figure 1) was developed using Processing. Player position tracking was implemented in Python using the YOLOv8 object detection framework. The tracked positions are visualized as a line graph, where a player’s rightward movement on the piste corresponds to a downward shift in the graph, supporting quick spatial interpretation of play dynamics.

5 Field Study: Real-World Validation at Fencing Tournaments

5.1 Overview of the Field Study

This field study aimed to evaluate whether flag input could be performed alongside regular journalistic duties during real matches, thereby testing the practicality of the proposed method. As in the survey conducted in Section 3.2, fencing was selected as the target sport. We conducted flagging field studies during both team and individual matches in which members of the Meiji University Athletic Association women’s épée fencing team participated.

Two members of the Meiji University sports newspaper organization, each with three years of experience covering the Meiji University fencing team, participated in the field study. Due to their availability, the field studies were conducted individually in two separate sessions. The first field study was conducted during the 76th Kanto Intercollegiate Fencing Championships, held in Tokyo in October 2024, which included both individual and team events. The second field study was conducted during the 2024 All Japan Intercollegiate Fencing Championships, held in Kyoto in November 2024, which included only team events. The Meiji University women’s épée team achieved excellent results in these competitions, as summarized in Table 2. A total of six team matches and seven individual matches were used in the field studies.

Table 2: Major Fencing Competition Results

Competition	Result
Kanto Intercollegiate Fencing Championships (Individual)	1st, 2nd, 3rd, 30th place
Kanto Intercollegiate Fencing Championships (Team)	1st place
All Japan Intercollegiate Fencing Championships (Team)	1st place

Table 3: Predefined Questions for the Semi-Structured Interviews

ID	Question
Q1	In what types of scenes did you input flags?
Q2	Was it possible to input flags while taking photos?
Q3	Did you feel that having only one type of flag was sufficient?
Q4	What aspects do you usually focus on when watching matches?
Q5	Are there any questions you would like to ask at this point?
Q6	Were the flags used merely for recordkeeping?
Q7	Which matches do you feel are worth revisiting?
Q8	Were there any matches you felt did not require review?
Q9	Did your criteria for flagging change as you became more familiar with the system?
Q10	Were there any scenes you now feel should have been flagged?
Q11	Were there any scenes you feel did not need to be flagged?

5.2 Basic Procedure of the Field Study

Before the match, participants were instructed to input flags during scenes they felt they might want to revisit later. During the matches, participants performed their regular journalistic duties as usual, with no instructions given regarding tasks other than flagging.

After each field study, we conducted semi-structured interviews to gather feedback on system usability and how participants performed the flagging. The interview questions are listed in Table 3. During the first field study, only Q1 through Q5 were prepared. Based on the results of the first session, additional questions Q6 through Q11 were added for the second field study.

5.3 Field Study 1: Kanto Intercollegiate Fencing Championships

As shown in Table 4, the number of flags added during each match indicates that the participants were able to input flags without any issues. However, in the individual matches, approximately half of the bouts were between two Meiji University athletes. All matches used in this field study followed a tournament format, and in bouts between athletes from the same university, one athlete was inevitably eliminated. Consequently, once the likely outcome became apparent, participants tended to flag scenes based on the perspective of the athlete who was likely to lose.

Table 4: Number of Flags and Match Results per Round

Competition	Round	No. of Flags	Match Result
Kanto Intercollegiate Women’s Épée Individual	Round 2	3	15–10
	Round 2	6	15–12
	Round 3	7	15–14
	Round 4	2	15–7
	Round 4	0	15–8
	Semifinal	7	15–10
	Final	5	15–13
Kanto Intercollegiate Women’s Épée Team	Round 2	4	45–21
	Semifinal	9	45–36
	Final	8	45–36
All-Japan Intercollegiate Women’s Épée Team	Round 2	4	45–32
	Semifinal	6	45–34
	Final	10	45–32

According to the semi-structured interview results, the response to Q2 indicated that participants were able to perform flag input without any problems while carrying out their regular tasks such as photography. Although flag input took a few seconds, prioritizing photography did not interfere with their regular journalistic duties.

On the other hand, several usability issues were identified in the application. During actual match observation, participants often forgot to press the “Start segment” or “End segment” buttons. This led to frustration and negative impressions of the system. As a result, for Field study 2, we decided to remove unrelated features such as segment management.

5.4 Field Study 2: All-Japan Intercollegiate Fencing Championships

Previously, a segment management function was included to help participants identify which segment a flag was associated with. However, since segment boundaries could be determined using video and chronological information, and because participants frequently forgot to press the “Start segment” or “End segment” buttons in Field study 1 (as described in Section 5.3), this function was removed. As a result, the system was simplified so that only the central screen of the application, shown in Figure 2a, was used.

According to the results, the number of flags per match is shown in Table 4, and all flag inputs were completed successfully. The semi-structured interview results from Field study 2 also supported the findings from Field study 1. Based on responses to Q2, the participants were able to perform flag input while carrying out their normal duties, such as taking and reviewing photographs. Although they reported a subjective delay of about five seconds in inputting flags, they commented that this was not an issue since they could take the

delay into account when reviewing the scenes using the chronological information system. In addition, the removal of the segment management function eliminated the negative opinions observed in Field study 1.

These findings confirm that smartwatch-based flagging is feasible in real match settings, validating the practicality of our proposed approach.

5.5 Post-Study Analysis

We analyzed the flags recorded during the two field studies, focusing on input patterns and flagged scene types. Many matches involved decisive wins, which may have limited the diversity of match developments.

When and Why Flags Were Placed We analyzed when and why journalists placed flags during the two field studies. Since many matches ended in dominant victories, the variety of match developments was limited.

In team matches (Table 4), both journalists placed fewer flags during the second round, where the focal team built large early leads and won by over 13 points. These one-sided matches, common in tournament formats, may have reduced the need for detailed review. When outcomes seemed certain, journalists may have shifted their attention to later rounds. As one participant commented in Q8, “I would never review the first match. I might ask something like ‘How did you feel in the first match?’ but I would focus on the semifinal or final instead.”

Fencing team matches consist of nine segments, which we divided into three phases: early (segments 1–3), middle (4–6), and late (7–9). For Journalist 1 (Table 5), most flags in the final were placed in the early phase, when the score was close and shifted frequently. In the semifinal, however, more flags appeared in the late phase, likely reflecting a successful rally after a temporary comeback.

Journalist 2 placed more flags in the final’s late phase, often tied to each athlete’s final appearance or visible emotional responses from the bench. In the second round and semifinal, flags were concentrated in the early phase when the outcome was still unclear.

Responses to Q1 confirmed that flags were often added during key moments, such as major shifts in score like comebacks or ties, sequences of consecutive points scored or lost, the resumption of play after interruptions, movements that differed from usual patterns, visible expressions of emotion such as fist pumps or shouting, and reactions from the bench or audience.

These results indicate that flagging was largely influenced by score developments and emotional intensity. Such moments often become central topics for interview questions. However, not every dramatic moment was flagged. Journalists relied on their own judgment to select scenes they considered meaningful.

Because the participants had no personal experience with fencing, they often evaluated the importance of a scene based on how the athletes or audience reacted. This suggests that their sense of significance was shaped more by social cues than by technical understanding.

Table 5: Number of Flags per Phase for Journalist 1

Round	Round 2			Semifinal			Final		
segment	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
No. of Flags	2	2	0	1	3	5	5	1	2

Table 6: Number of Flags per Phase for Journalist 2

Round	Round 2			Semifinal			Final		
segment	1-3	4-6	7-9	1-3	4-6	7-9	1-3	4-6	7-9
No. of Flags	3	0	1	3	1	2	1	1	8

Relationship Between Score Difference and Number of Flags We also analyzed the relationship between score difference and flag frequency. Figure 3 shows that flags were recorded more often when the score difference was small. The correlation coefficient ($r = -0.88$) indicates a strong negative relationship.

Although, based on the interviews, journalists generally saw leads of 5-10 points as decisive, flags were still placed in these periods, suggesting that emotional impact or notable reactions also influenced decisions beyond just score margins.

6 User Study: Exploring Question Generation with Flag-Based Review

6.1 User Study Overview

Building on the previous field studies that confirmed the feasibility of in-match flagging, this section reports on a user study that explores how reviewing matches with our proposed flagging system affects the content of interview questions.

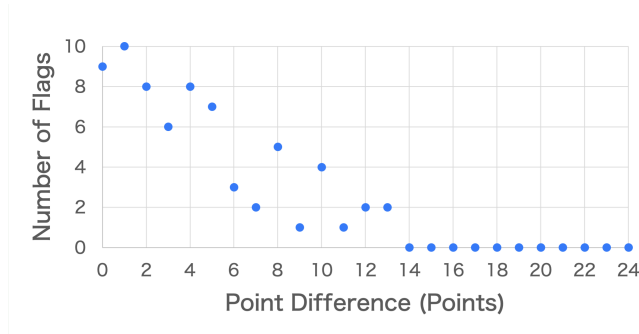


Fig. 3: Relationship between the Score Difference and the Number of Flags

Since a fully automated real-time video analysis system has not yet been implemented, the study was conducted using pre-recorded and pre-analyzed match videos viewed on a PC through the prototype system. The participants were the same two student journalists who also took part in the study described in Section 3.2. To evaluate the effectiveness of the proposed method, which presents both match videos and chronological information, we included two baseline conditions for comparison. One was a traditional method based solely on the participants’ handwritten notes, and the other was a video-only method that showed only the match footage.

During the study, participants first watched three match videos, each featuring a different athlete, and then formulated interview questions for each athlete. A time limit of two minutes was set for creating questions per athlete, during which participants used the system to review the match and generate questions. After the task, we conducted a follow-up interview survey. Each participant experienced all three methods. Journalist 1 followed the order of traditional method, proposed method, and video method. Journalist 2 followed the sequence of proposed method, video method, and traditional method.

6.2 Results of the User Study

To focus on the effectiveness of the proposed method, we excluded questions that referred to matches where a different method had been used for question generation. The analysis covered a total of 98 questions. To examine whether the content of the questions varied across different methods, we analyzed which elements were included in each question. Table 7 summarizes the results.

We analyzed five key elements found in the questions. These were: Location (player’s position), Time (elapsed time), Method (how points were scored), Score (including point differences), and Win/Loss (match outcome). The table shows the proportion of questions that included each of these elements. For example, a question such as "It looked like you were playing defensively for the first minute, but with the score at 8 to 10, what was your approach?" would be categorized as including Location, Time, and Score.

The results show that the proposed method led to more questions that referred to player positioning compared to the other two methods. Although the proportion of questions about attack methods was similar between the proposed and traditional methods, the content differed. The traditional method often used vague phrases such as “aiming for a counter,” whereas the proposed method

Table 7: Proportion of Questions Containing Each Element

	Location	Time	Method	Score	Win/Loss
Traditional Method (40)	0.04	0.02	0.37	0.27	0.27
Video Method (28)	0.25	0.07	0.24	0.35	0.35
Proposed Method (30)	0.34	0.04	0.38	0.23	0.17

yielded more detailed descriptions of attack methods, such as “dodging the opponent’s blade and targeting the hand.” The number of questions mentioning win/loss outcomes was lowest in the proposed method.

6.3 Discussion of the User Study

In total, the two participants generated 98 valid questions for three athletes during 18 minutes of question writing. In actual fencing interviews conducted by the author, the number of questions per athlete is typically no more than ten. Therefore, this result indicates that a sufficient number of questions were created. An analysis of the participants’ review behavior showed that they frequently focused on the time segments just before and after the flagged moments. This suggests that the flags played a key role in enabling efficient review and question generation within a limited amount of time.

The increase in questions referring to player positioning when using the proposed method is likely due to the fact that this method visualized player positions during review. The video-only method also led to more questions mentioning player positions than the traditional method. This suggests that player positions can be somewhat understood through video alone. Regarding questions about match outcomes, the proposed method had the lowest proportion. This may indicate that the system encouraged participants to focus more on subtle aspects of the match that are not easily observed, which reduced their reliance on outcome-based questions.

Questions that referred to player positions or included detailed descriptions of attack methods can be considered as questions that reflect a deeper understanding of the match. In Section 3.2, these types of questions were rated highly by both journalists and athletes. The increase in such questions when using the proposed method suggests that the system may help improve the quality of post-match interviews.

7 Limitation and Future Work

In this study, we conducted a two-stage user study. First, we carried out a field study to examine whether journalists could collect subjective flags while carrying out their regular reporting duties. Then, in a laboratory setting, we investigated the effectiveness of using these flags for retrospective question generation. We consider this two-stage approach to be an appropriate step for validating the core concept of our method before the full system is implemented. In the future, we plan to develop a system that enables immediate post-match review using both time-series information and match video. With this system in place, we aim to conduct on-site studies during actual post-match interviews in order to assess not only the overall effectiveness of the proposed method, but also its influence on communication between journalists and athletes. Furthermore, the current study was conducted with a limited number of participants, specifically two journalists and three athletes, and employed a qualitative user study approach. In future

work, we plan to broaden the participant base and conduct a larger-scale study to quantitatively assess the effectiveness of the proposed method.

The reason the user study was conducted in a controlled environment was due to technical limitations. At present, real-time video analysis has not been fully automated. In the current implementation, users must manually select the target person before the match. Tracking frequently fails when athletes cross paths or leave the frame, which makes manual re-annotation necessary. In addition, the processing speed is not fast enough for real-time operation, making it difficult to integrate into the actual schedule of sports journalists. For future development, we aim to achieve real-time video analysis by adopting more robust techniques. These may include leveraging sport-specific features, such as the tendency in fencing for athletes to return to their starting positions after a point is scored.

This study focused on fencing, as the author has domain knowledge and prior reporting experience in the sport. In the future, however, we plan to explore the application of the proposed method to other sports. The types of time-series information that need to be presented vary depending on the sport, and therefore the visualization method used in this study may not be directly transferable. Nevertheless, we believe the core idea of our approach—allowing journalists to flag moments they find subjectively meaningful and later refer to these moments during question formulation using match videos and play data—is broadly applicable to a variety of sports.

8 Conclusion

This study began by identifying key challenges faced by university student sports journalists. Through interviews, we found that these journalists often carry a heavy workload during matches and have limited time to prepare meaningful interview questions. An evaluation involving both athletes and journalists revealed that questions which explored specific plays and tactics were consistently rated more highly.

To support journalists in generating such in-depth questions, we proposed a match review system that presents match videos along with time-series data. This system allows journalists to flag scenes they personally found noteworthy during the match, even while carrying out other reporting duties. A field study confirmed that flagging was feasible under real-world working conditions, and that journalists tended to flag scenes more frequently when the point difference between players was small. Furthermore, in a user study using a prototype display system, the number of questions referring to player positioning and detailed attack methods increased. These findings suggest that the proposed method may help improve the depth and quality of post-match interviews.

In future work, we plan to implement real-time analysis methods and develop a fully integrated system that can be used within the actual schedule of sports reporting. Using this system, we will conduct further user studies to investigate not only the practical usefulness of the method, but also its impact on communication between journalists and athletes.

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