

User Perspectives on Electronic Health Record Functionality

A Qualitative Evaluation of Clinical Experiences

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Abstract— This study examines the experiences of clinical users with one Electronic Health Record (EHR) system, DIPS Arena. In a survey for users of DIPS Arena across several healthcare institutions in Northern Norway, 57 respondents gave text-based feedback in the functionality of the EHR system. The research identifies key challenges through a thematic analysis based on text answers in a survey. Four main themes emerged: system integration and stability, usability and design, administrative and clinical functionality, and training and support. The findings reveal that some health care professionals had problems with the EHR system in use, including fragmented data sharing, poor user interface design, increased administrative burdens, and inadequate training programs. These challenges could impact on workflow efficiency and patient care quality, highlighting the need for continuous improvements and user feedback from the EHR producer. The study concludes that while this feedback is not representative as a survey, it adds to the knowledge on what EHR producers need to be aware of when improving their product.

Keywords—Electronic Health Record (EHR); Functionality; User Satisfaction; Organization and technology; Installed Base.

I. INTRODUCTION

Over the past decade, the Norwegian government, as many western countries [1], has embarked on a comprehensive initiative to modernize its Electronic Health Record (EHR) infrastructure. EHRs offer numerous benefits, including improved efficiency, better access to patient information, enhanced communication among healthcare providers, and higher quality and safety of patient care [2]. However, potential adverse effects have also been reported, such as lack of integration between systems [3][4], poor usability [5], time-consuming documentation procedures [6], clinician burnout [7], and insufficient training [2].

These broader trends and challenges are also evident in the Norwegian healthcare system, where national efforts to modernize EHRs have led to the adoption of different implementation strategies across regions. The Central Regional Health Authority adopted a "big bang" strategy, implementing the EPIC system simultaneously across

multiple institutions, which encountered notable challenges and difficulties [8][9]. In contrast, the other three Regional Health Authorities pursued an evolutionary implementation strategy, introducing the DIPS Arena system by gradually building upon the existing infrastructure, which emphasizes the importance of developing new systems by leveraging and integrating with existing technologies to minimize disruption and enhance adoption [10].

Despite the differences in implementation, the effectiveness of any EHR system ultimately depends on how well it supports clinical work in practice. Previous evaluations of DIPS Arena have indicated overall user satisfaction with the system [11]. Previous studies looking at both DIPS Arena and its predecessor DIPS Classic have identified significant shortcomings in critical functionalities, like clinical workflow support and medication management [12][13]. Such gaps highlight ongoing challenges in achieving the full potential of EHR systems and underscore the need for deeper, qualitative insights into users' real-world experiences.

To address this gap, the present study analyzes open-ended survey responses to gain deeper insight into users' experiences with the EHR system. By examining how clinicians describe its functionality in their own words, the study aims to identify recurring themes, highlight critical areas for improvement, and assess how such insights might contribute to enhancing overall user experience.

The overall structure of this paper includes five sections: Section II explains the qualitative methods used; Section III presents the results; Section IV discusses the findings; and Section V concludes the study.

II. METHODOLOGY

A. Setting of study

A quantitative study was conducted in 2024 among clinical Electronic Health Record (EHR) users of DIPS Arena, three years after the systems' implementation.

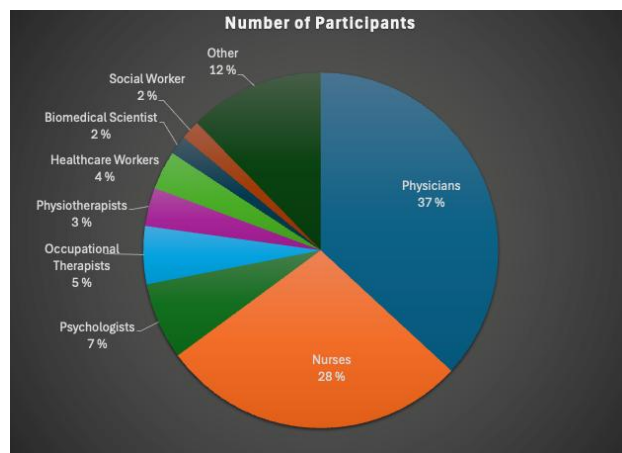


Figure 1. Number of participants.

A total of 549 participants were recruited via email from several healthcare institutions within the Northern Regional Health Authorities to ensure a representative sample of clinical users. The sample included participants from a diverse range of occupations, as seen in Figure 1. Prior to the main study, the survey instrument was pilot-tested with a subset of eight clinical users to assess face validity and ensure that the questions were clearly understood.

B. Data collection

The survey comprised both closed-ended and open-ended items. The closed-ended questions asked participants to rate specific functionalities in the EHR system using a five-point Likert scale. In addition, an open-ended free text question was included to capture qualitative insights regarding the systems' functionality. Participants were asked if there was anything else they wanted to comment on beyond the functionalities mentioned. A total of 57 users provided text-based responses to this question. Among them, physicians formed the largest group, with 21 individuals, followed by nurses, who accounted for 16 respondents. Psychologists were represented by 4 participants, while occupational therapists numbered 3. Physiotherapists and healthcare workers each contributed 2 participants. Additionally, there was 1 biomedical scientist and 1 social worker among the respondents. Finally, 7 individuals identified their occupation as "Other," reflecting a category of diverse or unspecified roles.

C. Analysis

The data were analyzed using thematic analysis, following Braun and Clarke's [14] framework. The analysis was conducted using Microsoft Word 365 (Microsoft Corporation). The first author (ESN) initially coded the text-based responses, and a total of 72 codes were developed. RP reviewed the codes, and any discrepancies were resolved through discussion until consensus was reached. These codes were then grouped into conceptually similar categories through an iterative process of comparison and refinement.

TABLE I. CODING AND THEMES

Theme	Qualitative Themes	
	Number of codes	Example Codes
System integration, technical stability, and communication	17	Lack of system integration, critical info not integrated across systems, no integration between CP3 and DIPS, systems load slowly
Usability, design, and navigation	10	Illogical shortcut keys, poor screen layout, too much clicking
Administrative processes, documentation, and clinical functions	17	Double registration in care pathways, manual medication entry, increased documentation workload
Training, implementation, and support	2	Poor training, inadequate e-learning and transition support

A total of 46 codes were retained for further analysis, as they were considered relevant to the aim of the study. The identified codes were subsequently organized into overarching themes that reflected the experiences of clinical users.

The themes were reviewed for clarity, then clearly defined and named to capture the underlying meaning of the codes. The final structure consisted of four overarching themes: (1) system integration, technical stability, and communication (17 codes), highlighting issues with interoperability, performance, and messaging; (2) usability, design, and navigation (10 codes), capturing interface and customization problems; (3) administrative processes, documentation, and clinical functions (17 codes), covering inefficiencies in data entry, documentation, and medication workflows; and (4) training, implementation, and support (2 codes), reflecting limited user preparation and transition support. Each theme was supported by representative quotations to ensure alignment with user perspectives. Table 1 shows examples of coding. The final themes were refined and validated through discussion between ESN and RP.

D. Ethics

All participants provided informed consent. The responses were anonymized and stored securely to ensure the confidentiality of participants' data throughout the study. The Regional Committee for Medical and Health Research Ethics in Northern Norway was consulted. According to national regulations and ethical guidelines, formal approval was not required because the study did not involve biomedical research and all data was anonymized.

III. RESULTS

A. Theme 1: System integration, technical stability and communication

The first theme emerged around issues related to the integration of different Information Technology (IT) solutions, system stability, and digital communication functions. Respondents repeatedly mentioned that the lack of seamless integration among different systems used by the

hospitals (DIPS, Metavisjon, and other solutions) leads to fragmented data sharing and delays in patient care. Users reported that data does not flow automatically between systems, resulting in additional manual work and potential risks to patient safety. For example, one bioengineer commented, “Generally speaking, we need a data system that communicates with the rest of the country. We in Tromsø do not see [data from] the rest of the country,” emphasizing the need for a unified and interconnected data system.

Many respondents described experiencing frequent log-in and log-out problems, which were compounded by slow system performance. This not only delayed clinical workflows but also forced users to manually verify and re-enter data across different platforms. A nurse remarked on the issue of critical information being split across separate systems: “Critical information in DIPS Arena and the National Patient Portal must be merged as soon as possible. The synchronization should be completely automatic and without the need to approve the data transfer. This will safeguard patient safety in the best possible way.”

Respondents also discussed inadequate digital messaging solutions, such as the inability to send messages to municipalities from certain outpatient clinics, further widening the communication gap between departments. The overall sentiment indicated that the systems’ technical instability and lack of proper integration not only contributed to workflow inefficiencies but also caused considerable frustration among clinical staff.

B. Theme 2: Usability, design and navigation

The second theme focused on challenges associated with the systems user interface and design elements. Many users expressed their dissatisfaction with the logical flow of menus and the overall layout of the system. Complaints were centered on the unstructured design, inadequate screen utilization, and inefficient navigation mechanisms that require numerous unnecessary clicks. One physician compared the current system unfavorably with its predecessor, stating, “User-friendliness in DIPS Arena is poorer, and less organized than DIPS Classic,” highlighting that the new system has not enhanced, but rather detracted from, the user experience.

Additional concerns related to the inability to personalize or customize the interface were also raised. The absence of customizable settings forced users to adapt to a rigid interface that did not align with their specific workflow needs. This issue was underscored by a clinician’s observation regarding the inconsistency of shortcut keys: “Keyboard shortcuts!! I use/have used keyboard shortcuts for all software – but the DIPS-Arena setup is unusable. Keyboard shortcuts that one has become accustomed to change function between versions. ‘CTRL-D’: first ‘insert diagnosis,’ now ‘delete document’!!!!” Such changes in key functions contributed to the perception that the system design was not only counterintuitive but also disruptive.

Furthermore, users wrote that the placement of symbols and buttons across the interface was disorganized. A nurse highlighted that “Very messy design. The icons are not intuitive and are placed in different positions,” indicating that the scattered placement of icons and the requirement to frequently move the mouse across different areas of the screen hindered efficient data entry and increased cognitive load. The design issues were also linked to a potential compromise in patient safety, as one physician noted that the burdensome interface resulted in more manual corrections and delays in retrieving vital patient information.

C. Theme 3: Administrative processes, documentation and clinical functions

The third theme addressed the burdens associated with administrative tasks, documentation, and core clinical functions within the Electronic Health Record (EHR) system. Many respondents voiced concerns about redundant administrative procedures, particularly the necessity for double data entry and the use of poorly designed journal templates. Several users described the workflow as time-consuming, with one occupational therapist lamenting, “I feel like quitting my job every time I have to do this completely pointless and burdensome registration.” Such comments point to the inefficiency embedded in the administrative aspects of the system, where manual inputs and repetitive documentation tasks detract from time available for direct patient care.

The issue of double registration was mentioned repeatedly, with clinicians noting that the lack of automation in critical areas, such as medical coding and other standardized templates, resulted in unnecessary administrative burden. One physician remarked that “The so-called savings with EHR have contributed to secretaries being laid off and tasks being transferred to the doctors,” a shift that not only increased the workload for physicians but also compromised the overall efficiency of the healthcare delivery system.

Another area of concern was the handling of referrals and other administrative documents. In some departments received referrals were misdirected, forcing staff to spend considerable time sorting and redirecting them. One respondent reported that this misrouting “...steals about seven hours of work time per week from our outpatient clinic,” thereby highlighting the inefficiencies introduced by the current system design.

Furthermore, challenges with medication management were also brought to the forefront. A healthcare professional noted, “Patients’ medications are not digitized in our system. This must be implemented,” emphasizing the need for an integrated digital solution for medication tracking. The lack of efficient documentation protocols and standard templates was seen to further impede the effective recording and retrieval of clinical data.

D. Theme 4: Training, implementation and support

The final theme emerged from respondents' experiences with the training, implementation, and support provided during the transition from the previous system (DIPS Classic) to the updated version (DIPS Arena). Even though there was a small number of codes, there were some users expressing frustration over the inadequate e-learning modules and classroom sessions. One informant encapsulated the sentiment by stating, "The implementation process transitioning from Classic to Arena was too challenging, and we had no direct contact with the system developers." This lack of direct access to developers during the critical phase of system implementation appears to have significantly contributed to user stress and misinterpretations of system functionalities.

One respondent criticized the training materials, noting that the content was neither comprehensive nor tailored to the specific needs of different user groups commenting "The training component, which consisted of e-learning and classroom instruction on a screen, showed so little of what was supposed to be learned that one could hardly see anything. It should have been arranged so that you could choose which parts of the program you needed, as less than half was relevant to my job." This sentiment underscores the mismatch between training content and the practical needs of clinical staff, which in turn led to increased reliance on self-directed learning and peer support.

IV. DISCUSSION

Overall, the findings across these four themes reveal challenges related to integration, design, administrative functionality, and training support. The responses from clinical users illustrate that the Electronic Health Record (EHR) system DIPS has been accompanied by operational disruptions, affecting both the efficiency of clinical workflows and the overall quality of patient care.

The first theme, concerning system integration, technical stability, and communication, reveals a fragmented digital infrastructure in which different systems—such as DIPS, Metavisjon, and various ambulance solutions, fail to communicate seamlessly. This fragmentation is not a novel observation in the literature; several studies have noted that a lack of interoperability often results in manual workarounds and increased risk to patient safety [3][4]. Our respondents' emphasis on the need for a system that "talks with the rest of the country" reinforces the call for more unified, interoperable systems. Moreover, the technical instability and slow system performance reported by users are consistent with previous observations that EHR transitions can disrupt clinical workflows [6].

The second theme focuses on usability, design, and navigation. Users reported issues with the user interface, including poorly structured menus, non-intuitive iconography, and inconsistent shortcut keys. These findings align with existing studies that argue poor usability and design can increase cognitive load and even contribute to

clinician burnout [7][9]. The comparison made by one physician between DIPS Arena and DIPS Classic indicates that the redesign did not meet some users' expectations in terms of efficiency and intuitiveness. The physician stated that the interface in DIPS Arena was inferior to DIPS Classic. It is noteworthy that this argument is presented three years after implementation.

The third theme, administrative processes, documentation, and clinical functions, reflects a critical concern regarding increased administrative workload. Respondents reported double registrations, burdensome journal templates, and an inefficient referral management system. This aligns with previous research linking increased documentation requirements to reduced patient interaction time and greater clinician frustration [6][8]. The observation that "The so-called savings with EHR have contributed to secretaries being laid off and tasks being transferred to the doctors" underscores the frustration among some clinicians. This finding supports the notion that while EHR systems are designed to enhance operational efficiency, their practical implementation can sometimes lead to counterproductive outcomes.

The final theme, concerning training, implementation, and support, further suggest that the transition from DIPS Classic to DIPS Arena was not sufficiently supported by training programs or direct engagement with system developers for personalization. Moreover, these issues appear to have persisted over time. The lack of adequate training has been highlighted in previous studies as a key factor that hinders successful system adoption [2].

Our findings align closely with previous studies on this system, which identified significant functionalities—such as drug treatment overview, prescribing, and care planning [12], as well as medication management, clinical workflow support, and system stability, as areas associated with lower user satisfaction [13]. Together, these studies underscore that the challenges inherent in the DIPS Arena system are not new, reinforcing the need for continuous user feedback and iterative improvements to better support the evolving demands of health information infrastructures.

Despite offering valuable insights into user experiences with the DIPS Arena system, this study has some limitations. The relatively small subset of qualitative responses (57 participants) may not capture the full spectrum of user experiences, and the reliance on self-reported data introduces potential biases. Respondents were likely more inclined to provide negative feedback, potentially due to self-selection bias, in which individuals with adverse experiences felt more compelled to respond—thereby limiting the representation of positive perspectives.

V. CONCLUSION AND FUTURE WORK

In this paper, we set out to explore and understand clinical users' experiences with the DIPS Arena Electronic Health Record (EHR) system, focusing particularly on its functionality and impact on clinical workflows. Our findings

reveal that while the DIPS Arena system was developed with the intention of modernizing clinical workflows and enhancing patient safety, our findings reveal ongoing challenges in system integration, usability, administrative processes, and support structures three years after implementation. This finding is not confirmed by the quantitative results but still holds value, as it provides insight into user complexities. These issues, consistent with other studies, underscore the need for continuous user feedback and iterative refinements to better align the system with real-world clinical needs. Future research with more complete samples, combining qualitative and quantitative data, is needed to further elucidate these challenges.

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