RN/06/11
April 24, 2006

Research
Note

Novel Applications for Information Technology in Risk Assessment for Children's Social Care in the UK

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Abstract

In recent years the UK government has legislated many changes pertaining to professionals working in Children's Social Care. In particular, new work practices and computer systems, such as those specified for the Integrated Children's System (ICS) are mandated to encourage effective case management and greater information sharing. In this paper a review of ICS from a technological viewpoint is presented and potential, research topics are discussed.

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1 Introduction

It is estimated that between 1 and 3 children die of abuse or neglect each week whilst in the care of their parents and that these children are often under the age of five years. These figures are an under-estimate as there are children whose deaths are noted as accidental but where the causes may be more sinister. It is also important to remember that there are a number of children whose lives are blighted by abuse and neglect. These children may have their resilience so impaired that removal from their families at some later stage may be too late to effect recovery. Although there is significant potential for computer-based tools to support practitioners working in Children's Social Care, this has not been exploited. Computing applied in child protection is limited, timid and architecturally and organisationally constrained. Technological lessons learned elsewhere have not been fully absorbed into a field in which these lessons could be of substantial value.

The purpose of this note is to explore work practices in the UK, particularly the Integrated Children's System (ICS) [DfES, 2003c] and to think about how computer science might aid practitioners in the risk assessment process. In section 2, events that lead up to the inception of ICS are reviewed, followed by section 3, in which ICS is described in the context of other related initiatives for information sharing in social care. There are several other contemporaneous, national projects which could have an impact on computer systems supporting ICS and a selection of these is described in section 4. Government standards are described in section 5. In section 6, the technical specifications for ICS are covered followed by an evaluation of ICS, again from a technical viewpoint. Some commercial software houses have already developed products for ICS although scant information is available about them, section 8. Finally, a brief review of related research is covered in section 9 and in section 10 research topics for future investigation are presented.

2 Background

From the mid-1990s the government has attempted to standardise practices relating to situations where children come into contact with social care agencies. In 1995, the 'Looking After Children' (LAC) materials were launched for practitioners to improve recording, assessing, planning and reviews with respect to children looked after away from home. This was followed in 2000 by the broader-based 'Framework for Assessment of Children in Need and their Families' (FACIN). According to [Smallwood, 2004], whilst LAC and FACIN were generally welcomed by parents and carers, there were problems with the the computer systems supporting them caused by the fact that the two systems were operated in isolation with no facility for cross-referencing or transferring key information. Subsequently the Victoria Climbie inquiry [Laming, 2003] and the Joint Chief Inspectors' report 'Safeguarding Children' [DoH, 2002] triggered a set of government policies resulting in activities to support improved care practices for children and families in the UK. Foremost of these was the Green Paper: Every Child Matters [DfES, 2003b] which set out a national framework for local programmes of change and culminated in the Children Act 2004 [DfES, 2004], the components of the framework are described in section 3.

3 Every Child Matters

The Green Paper dictates that local organisations responsible for providing services to children are integrated to form Children's Trusts which are expected to work together to protect children and young people. The new framework to support this is composed of: the Common Assessment Framework (CAF) supported by a national database and a set of detailed work practices for social care staff working with children. The key elements are described in the following subsections.

3.1 Information Sharing Index

By the end of 2008 a small amount of core data will be held on every child in England in the Information Sharing Index [DfES, 2003c], details will include: the general practice where they receive primary health care, the school they attend, the contact details of practitioners working with the child and whether or not an initial assessment has been conducted. Whilst there is not more sensitive information held, even this has caused privacy concerns since the index will allow a wide range of practitioners to see who has been in contact with the child or family and to infer what kind of services they have been using. In terms of its implementation, the index will be central with the data partitioned into 150 parts - each relating to one of the 150 local authorities in England. A central index will ensure that the system can accommodate children who move areas or who access services from more than one authority. Partitioning the data will enable local authorities to take the lead in maintaining the accuracy of the records for children living in their area.

3.2 Common Assessment Framework

The Common Assessment Framework (CAF) [DfES, 2003a] embodies a national approach to assessing the needs of children and young people. It has been designed so that practitioners of all professions will be able to complete an initial assessment in a systematic, simple way if they become concerned that a child's needs are not being addressed. This assessment can be shared with other practitioners if necessary to work out what action is to be taken and by whom. The Index will record that a common assessment has been carried out by a practitioner identified as being in touch with the child. Another practitioner looking up the child on the Index will discover immediately whether a common assessment has already been carried out and who else to contact about the child. Currently, the eCAF project is underway rolling out the Information and Communications Technology (ICT) systems to support CAF nationwide. The government is using the services of Capgemini Consulting to identify and implement a solution compatible with other government projects, some of which are covered in 4. Data interface standards and XML schemata for CAF forms will be defined although there is no information on these at the moment.

3.3 Integrated Children's System

The Integrated Children's System (ICS) [DfES, 2003c] is a conceptual framework, practice discipline and business process developed for front-line social care staff. It applies to four main groups of children: those in need at home, children on the child protection register, children looked after including those whom have been adopted and care leavers. Supported by information technology, ICS is the core of the electronic social care record for children, described in section 4. It is hoped that, in the future, when a child is referred an assessment is recorded on an electronic record system an electronic message will be sent to notify the Information Sharing Index of a child's social services activity and to seek information about who else is involved. In addition, if a common assessment on the child exists, the information will easily be incorporated into the assessment sections of the ICS because the information on needs in each system is organised on compatible lines.

4 Other National Projects

There are a plethora of national projects that are related in some way to the systems proposed for 'Every Child Matters'. Some of these will require agencies to store electronic case records and assessments, for example: those held by Youth Offending Teams. A similar relationship to that of the case records supporting the ICS will exist between these case record systems and the Information Sharing Index and the CAF. A selection of these projects and initiatives are set out in this section, giving an overview of the wide range of activity in this area and the likely complexity of interaction.

Electronic Social Care Record (ESCR), November 2003: [DoH, 2004a], this will now be implemented as part of the Integrated Children's System. Records will be composed of both structured (forms) and unstructured information (notes, emails) plus codes for reporting purposes.

National Service Framework for Children (NSF), 2004: [DoH, 2004c], sets out standards for childrens health and social services, and the interface of those services with education. Amongst other things, the framework promotes work practices that ensure the focus of welfare practices remains firmly with children and their families as opposed to government organisations.

Children's and Maternity Services Information Strategy, 2004: [DoH, 2004b], developed to ensure that: building blocks are in place both nationally and locally for sharing data within the NHS and with and between other agencies; for identifying children and young people and having their up-to-date records available wherever they present to the NHS. It commits the DfES to produce guidance on sharing both clinical and non-clinical information between agencies.

FrAmework for Multi Agency Environments (FAME): [ODPM, 2006], an initiative sponsored by the ODPM to support multi-agency information sharing: scant information is available as yet.

Reducing Youth offending Generic National Solution (RYOGeNS): [ODPM, 2004] is a web-based, system that helps practitioners from different agencies to identify, assess and refer vulnerable children, enabling local authorities across the UK to deliver on both Crime prevention and Children's agenda. According to the web site, there are five RYOGeNS pilots currently in existence.

5 Government Standards

With the high number of government ICT systems that are expected to share data, issues arise around patient consent, the interfaces between systems and the transfer of data. This is recognised in [DoH and Cabinet Office, 2006], in which the problems with data sharing between the Health Services and Adult Social Care are discussed. The government is due to issue new guidelines by December 2006 and these should be directly applicable to Social Care computer systems. Current information about standards for data sharing can be found on the following web sites:

GovTalk [Cabinet Office, 2006] GovTalk is the UK body responsible for setting standards for seamless electronic government. The web site contains the set of policies and standards, including XML schemata, necessary for e-government. For example: e-GIF is a set of technical policies and specifications governing information flows across government and the public sector. They cover interconnectivity, data integration and e-services access. There are no there are no data standards or policies for social care as yet although there are several for health care including the NHS data dictionary and the SNOMED Clinical Terms dictionary. The latter provides a single unified terminology to underpin the development of the integrated electronic patient record.

Scottish Social Care Data Standards Project: [SSCDS2, 2006] SCDS2 has been set up by the Scottish government with the aim of producing consistent, high quality social care data standards. There are work projects that relate to children and families although not many have resulted in consultation papers or standards yet. Work areas include Child Protection, an Integrated Children's Services Record (ICSR), and a Shared Assessment Framework.

6 The Integrated Children's System Specifications

In this section the Integrated Children's System is described from the perspective of the technical specifications available. Particular attention is given to the chronology and its place within the ICS because the focus of this research project, with its emphasis on risk assessment, is likely to centre around this. The government has produced a series of specifications and training materials [DfES, 2003d] aimed at Social Work professionals, Local Authority IT and managerial staff and product vendors alike. Broadly speaking the documentation is composed of:

Exemplars: The exemplars are a set of forms covering all the important processes for which practitioners must manage information, for example: assessments, plans and records of key events. The purpose of the forms is to provide practitioners and technical staff with examples of what they may expect from an IT system although the input and output screens do not have to physically resemble the exemplars and may be tailored to suit the Local Authority's needs as long as the underlying logical data model is supported.

Outputs: Although ICS is primarily a set of processes with a corresponding data model, it is not simply a system of recording information, the importance of being able to review, organise, analyse and exchange the data is recognised and addressed in [DoH and The Welsh Assembly Government, 2003, DfES and The Welsh Assembly Government, 2004]. The DoH/DfES commissioned research resulting in a methodology for describing and categorising the outputs for an ICS IT System. The research identifies and discusses some of the key outputs for ICS and provides advice on the steps that should be taken to obtain useful information from the system in many forms such as screens, reports, web pages and alerts. Maintaining information quality and reporting through filters and "cross-views" is also covered. One of the messages conveyed is that outputs from the system should not be static, they should be user-controlled and highly configurable.

A Process Model: The process model sets out the core processes for delivering children's services which are common to all councils with social services responsibilities. Its purpose is to relate the core processes to the information that is either generated or required by those processes. Each discrete process is accompanied by a statement of the data management requirements.

Process Flow Diagrams: These are diagrammatic representations of the flow of operations within core case management. They supplement the text within the Process Model and can be used independently of it. It is hoped that they will make it easier to understand some of the more complex processes within Social Services and be of widespread use both throughout the field and in educational circles.

Logical Data Model: This model expands on the definitions and attributes of the data items identified in the Process Model and maps the logical connections between them. Its purpose is to document the logical information requirements which will assist designers of software systems, together with the Process Model, to build in the required functionality.

6.1 The Chronology

Social workers frequently have to construct or refer to a chronological history of events relating to a child or even a group of children related in some way for assessment purposes. This is an essential part of social work practice. The chronology exemplar [DfES, 2003e] illustrates how the significant events in a child's life can be displayed giving an instant overview of selected key events for appraisal. The chronology is likely to be one of the key outputs of any IT system used for risk assessment and it could form the basis of a decision support tool for social care practitioners. The exemplar contains many different types of information ranging from records of social services involvement, health history and education, training and employment history for the child.

7 Evaluation

Only a handful of 'trailblazer' authorities have implemented IT systems supporting ICS and no critical evaluation has been conducted as yet. There has been little critical analysis based on the published specifications from the academic community. The potential drawbacks of ICS are significant:

Lack of Flexibility: The procedures set out for ICS work practices are detailed encapsulating best practice. Embedding social care practices in computer systems software has consequences which need careful consideration; when processes change, the software must also be altered potentially incurring huge costs for the Local Authority over and above the initial development costs.

Privacy: The security of the data held about children and families is of paramount importance. Concerns remain regarding the potentially wide distribution of sensitive information about children and families.

Support for Mobility: There are important issues raised by a mobile workforce. A Social Worker or Team Manager may wish to download case records to their laptop, prior, say, to a visit or Case Worker meeting. This raises several questions: How will information be secured both in transit from one device to another and when it is stored on the mobile device? How will access to such information be controlled and how will data be synchronised reliably? There are requirements specifications covering this scenario [Cabinet Office, 2003] and a set of guidelines covering a security framework [Cabinet Office, 2002] but specific technologies are not mandated implying that each Local Authority is responsible for the security of their own IT systems. With such potential variation, vulnerabilities are more likely. Interaction between computer systems within a local authority may also be hindered by a lack of common technologies and lack of a common data model.

Information Sharing: The key purpose of ESCR, CAF and the ICS is to facilitate data sharing amongst professionals working with children. However, local authorities are free to implement the ICS specifications in whatever manner they choose implying that cooperation and sharing beyond the boundaries of the Local Authority may be problematical, incurring more costs. The government does have standards for information exchange [Cabinet Office, 2006] but there are no data dictionaries or ontologies available yet which might support a common understanding of Social Care, neither are there XML schemata for records or techniques for their exchange.

Data Validity: The challenge of maintaining accuracy in large-scale databases is noted in [Munro, 2005], a recent survey of the police national database by the Police's Security Inspection Unit found an error rate of 86% in data recorded. It is expected that information about children might change fairly rapidly requiring modification almost daily in some circumstances. It is not clear that sufficient measures can or will be taken to avoid errors in the new ICT systems nor is it understood what the consequences of potential inaccuracies might be.

Tools for Risk Assessment and Analysis: according to [Munro, 2005], the ICS does not address the serious problems sometimes identified with risk assessment and inter-agency communication. Firstly, the misinterpretation information and events is often an issue and in consequence the significance of sometimes serious events may be underestimated. This is a common, if not surprising, phenomenon in a world where evidence is often ambiguous and there is no commonly agreed terminology. Secondly, staff are often reluctant to change their minds about a case in situations where new events show that a child is now at risk. Whilst this can be attributed to human nature, it implies that the social workers most intimately involved should have access to a healthy supervision function with plenty of opportunity to review cases with colleagues. Unfortunately, supervision is a task which is increasingly reduced as workloads increase. The ICS has no analysis components which might help this situation as it is principally a recording and presentation tool.

8 Commercial Products

In table 1, commercial products for ICS are listed. Very little technical information is available on the company websites and it has not been possible to assess the products.

Company	Product	Notes
Anite	SWIFT	Many local authorities already use the Anite SWIFT product for social care services based on an Oracle database. SWIFT is being extended to encompass the requirements for ICS. Mobile working is supported through the mWork product.
OLM Group	CareFirst-CareAssess	The product supports ICS, the Single Assessment Process/Single Shared Assessment/Unified Assessment Process and the Common Assessment Framework. There is no mention of support for mobile working on the website.
LiquidLogic	PROTOCOL	PROTOCOL is not a complete (database) system in itself but is designed to be complementary to existing IT systems. PROTOCOL can be used to design systems allowing users to view data and manage a process across a federation of partners whilst working through one interface. Some of the other products from this company allow customers to download and use information offline.
In4tek	Paris Child Health, Paris Mobile	Supports ICS and allows practitioners to download information and perform form-based assessments offline, synchronising with the central system periodically.
Careworks	Product:RAISE	The product is being extended to support ICS.
Esprit	ShareCare	Supports ICS, the website does contain some high-level architectural information about the product.

Table 1: *Commercial Products Supporting ICS*

9 Related Research

This is not meant to give exhaustive coverage of related research domains but will give a flavour of some current activities. Two research areas have been covered, Social Care Informatics and Health Care Informatics; health care is particularly interesting because it is a well-established discipline lead by both computer scientists and health care professionals. UCL has a long running research group, CHIME, which has an impressive research record.

CHIME: The Centre for Health Informatics and Multiprofessional Education, [CHIME, 2006a] undertakes research in information and quality management, to support clinical practice. There are several relevant projects encompassed by the CHIME umbrella, including the CLinical E-science Framework: CLEF, [CHIME, 2006b]. CLEF is a partner in this new 3-year MRC e-science project to develop a research workbench supporting queries on large volumes of anonymised cancer and genetic records. The work will combine federated record services, ontologies, term extraction, language generation and anonymisation techniques.

openEHR: [openEHR, 2006] is a non-profit open source organisation bringing together an international community of people working towards the realisation of electronic health records to support seamless and high quality

patient care, which are clinically comprehensive, ethico-legally sound and interoperable. openEHR is co-ordinated from UCL in close collaboration with colleagues in Australia. There is a specific collaboration with the European Records (EuroRec) Institute to relate to user and vendor communities.

Tracking Children and Accomplishing Risk: E-Assessment in Child Welfare, [University of York, 2006] is a two year project in collaboration with the NSPCC. The aims are to study and evaluate the implementation of the government's Information Sharing and Assessment project and consider the implications of e-technology in child welfare for relations between professionals, children and families. and tracking. Primarily, the work will attempt to determine how far developments in e-technology in child welfare improve inter-professional communication and early intervention responses.

Understanding New Forms of Digital Record for e-Social Science , [National Centre for e-Social Science, 2006] seeks to explore and understand how new forms of digital record may emerge from and for e-social science and examine how Grid based technologies can be extended to provide new processes and services through which social science information may be collected, collated, and distributed. Social scientists will work in close partnership with computer scientists on three Driver Projects to develop e-social science applications demonstrating the salience of new forms of digital record.

10 Future Research Topics

In many ways, the ICT-based revolution that social care seems about to undergo has significant parallels with that experienced in health care in the last ten to fifteen years. The application of computer science to health care has engendered the field of bio or health informatics, defined as: "the intersection of information science, medicine and health care. It deals with the resources, devices and methods required to optimize the acquisition, storage, retrieval and use of information in health and biomedicine", [Wikimedia Foundation, Inc, 2006]. Health informatics provides a rich source of information, perhaps the challenges for social care informatics are similar and perhaps we can learn some important lessons?

In considering potential research areas we relate the target area - risk assessment, the problems noted with ICS in section 7 and some of the current research conducted in the field of health informatics. First of all, since social care informatics is a relatively new field, it is important to consider what needs to be done to support research in general before considering risk assessment specifically. The answer to this question seems to centre around the development of a data model that can be used as a basis for research in many fields by all sections of the research community. This is the approach adopted in the field of health informatics. A data model would include:

A social care dictionary of terms or ontology: Having a shared understanding of terms in social care will enable knowledge sharing and analysis, a dictionary of terms is probably the minimum requirement for this. Ontologies take definitions one step further, from [Wikimedia Foundation, Inc, 2006], the term ontology refers to a data model that represents a specific part of the real-world and is used to reason about the *relationships* of objects in the world. In this sense it differs from a simple dictionary. For example: a social care ontology would contain a description for the terms "carer" and "looked-after child". It would also contain the term "fosters" as a relationship between these entities. Ontologies can be used by computers (agents) to answer queries by reasoning about semi-structured information.

XML Schemata: Currently most electronic records are defined using XML markup language providing a common format for the storage and distribution of information. Without this, we are unlikely to achieve the government's vision of information sharing between agencies or realise the promise of mobile working. Neither will it be possible to produce widely-used information systems.

Security is another promising area for research. Again, we will not be able to support the information sharing agenda or the vision of mobile working without careful consideration of the issues. At a high level, these are some of the areas that merit further consideration:

Securing Data Exchange: There are 150 local authorities in the UK and no standards for the electronic transfer of social care records between IT systems. We need to consider what information can be transferred in response to any particular request, under what circumstances it can be transferred and how it should be protected in transit.

Authorisation and Privacy : Some of the data held on social care information systems is likely to be extremely sensitive in nature. We need to control who is able to see specific views, to log what has been viewed and for

what purpose. Careful consideration should be given to the security mechanisms used and there are significant benefits in using 'open' or 'public' security techniques. The principle advantage is that well-known and established standards are more likely to have been reviewed by a number of experts in the field and vulnerabilities are likely to be fixed more speedily. Finally, we may also need to consider the issue of consent before certain kinds of information can be transferred between government agencies. Parents may have to authorise the release of information, it would be interesting to think about how could this be obtained electronically?

Anonymisation : To date, little research, if any, exists for the analysis of large, social care data sets despite the fact that computer systems for recording assessments have existed for several years. The fact is, it is unlikely that we will ever be able to perform any large-scale data analysis unless we find some way of anonymising data records. Specifically, it is important that it is not possible to infer information about data subjects where the querier has access to several, related data sets.

Based on this groundwork, decision support tools can be developed to help the practitioner. In section 6, we have proposed that such a tool could be based on a chronology. We will need to investigate this list of questions before embarking on the design:

- What questions should a decision support system answer?
- How does a human evaluate case record information?
- How should a computer mimic, aid or improve upon a practitioner's analysis of case data?
- Is evidence-based information useful to practitioners in decision support and how should it be used most effectively?
- What HCI techniques can be used to aid recognition of significant events?
- What actions should be prompted on recognition of significant events?

11 Conclusion

In this note we have explored how ICT might assist risk assessment for children by social care staff. It is evident that any new tools must take into account new social care practices, integrate with existing ICS software and interoperate with the large number of national projects that contribute to the government's information sharing agenda. Whilst this is a desirable goal, it is currently unattainable because there are no public specifications covering the interfaces between tools or the transfer of data between systems. The field of health care informatics offers some valuable lessons for the way forward: if software is to be widely adopted it must be based on public data models approved by accepted standards bodies. Careful consideration must also be given to the security threats posed to government information systems. It will be some time before such open standards exist for social care records, nevertheless it should be possible to design tools with a certain amount of flexibility so that minimal changes are necessary when standards are available. It would be interesting to look at enhancing the role which the chronology plays in enabling a social care practitioner to conduct risk assessments. As a next step, more needs to be understood about the steps that a social worker goes through, particularly in light of the problems noted with assessment and the assimilation of data on new events.

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