Submission to the Productivity Commission by Grays Institute, a registered Australian Charity for increasing access to Justice

This submission is intended to assist the Productivity Commission to formulate policy recommendations that are in the long term interest of the Australian community. The concern is for the well being of the community as a whole.

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1. Summary of recommendation sought

The submission is that the federal government initiate a pilot study of the use of the superexpert shell called eGanges. If the pilot study so warrants, then such use of eGanges should be adopted throughout the federal administration. eGanges has been offered free to government in return for government contributions to the free online library of legal superexpert systems of Grays Institute at http://www.graysinstitute.org

2. eGanges

eGanges is software that is a superexpert system shell; it shows maps of complex rule systems, and automates their complex application to a user case. User input is received as answers to a complex system of questions, based on the rule maps. This interrogation offers a four valued logic to construct the user's case; the selection of the relevant rules is automated cumulatively as user answers are received as input. The result of the application of these rules to the user's case can be seen in transparent feedback windows. The software is user-friendly; university students were able to use it after one hour of training. The River graphics that represent the rule logic system assist understanding of complex law by persons for whom English is a second language.

The description superexpertise indicates the management of complex extensive rule maps and complex interrogation, as well as the automation of the complex combinatorics that arise from the four valued selection options of the user for each of the antecedents in the complex rule system. The construction of the user's case, the selection of the relevant rules that apply to it, and the consequents and Final result of the application of the rules to the case are instantaneous because of their electronic automation. The automation implements four valued truth tables; the compact nature of the software results in small data storage requirements for both the shell and its applications.

The adoption of eGanges as a common tool of the public service and politicians, would require a paradigm shift comparable to the adoption by the public service of word processors in the place of typewriters. It is a move to smart law available to the Australian community freely. AustLII views eGanges as an intelligent front end to its databases, as eGanges provides an opportunity to link its apps at the exact relevant point in its rule maps, to the particular AustLII black letter law that applies.

The rule system maps of the eGanges software are an advanced form of the Ishikawa quality control fishbone; the eGanges software uses the concept of a River system rather than a fishbone. User-friendliness is maintained in the software design and the simplicity of the user interface. Dr Pamela N. Gray LL.B (Melb), BA (Melb) LL.M (Syd), PhD (Wsyd), an experienced legal practitioner and law lecturer, now sole trustee and founder of Grays Institute, designed the software as part of her doctoral work on legal knowledge engineering methodology for large scale expert systems. Her son, Xenogene Gray Bsc (Adv)(Hons)(Syd), MPhil (Computing)(McQ), GDipEd (Secondary)(McQ), Certificate IV [TAA40104] in Training and Assessment, Macquarie Community College, a physicist, mathematician, computer scientist, science teacher, and qualified trainer, programmed eGanges and verified its complex automation in his M.Phil thesis on Superexpertise. eGanges is a quality control superexpert shell suitable for the legal domain; its use would give politicians and their administration ready superexpertise and quality control of their work. If the necessary steps were taken to adopt this paradigm shift, government and the Australian community would ultimately benefit with much greater speed, efficiency, understanding, and management of complexity regarding the law and its application.

3. Advanced, sustainable technology

The federal Department of Repatriation experienced the benefit of early expert systems technology when they used the software of Softlaw in the 1980s. However, this software required slow and costly computer hardcoding to get up and maintain. Its successor, Ruleburst, provided pseudo coding which was not user-friendly. Ruleburst was apparently acquired by the large US Computer company, Oracle, and seems to have become defunct. By contrast, eGanges is user-friendly, both in construction and in consultation modes. Legal experts could readily learn to construct and maintain apps available for departmental, governmental and community use. There are three steps required:

1. A certain legal knowledge engineering analysis of the subject law is required in constructing an eGanges app, in order to formalize the rules of law as an eGanges River system. As an illustration, Figure 1 shows the River system for the law of negligence. Figure 2 shows the user-friendly interface of eGanges which has a Rivers window in which rule systems can be readily constructed and consulted. Each stream represents a rule and each node on the stream represents an antecedent in the rule. River graphics and nesting can be quickly constructed and changed; if Rivers are too crowded or complicated for a single screen, they may be nested to another screen, and then further nested as far as the knowledge requires.
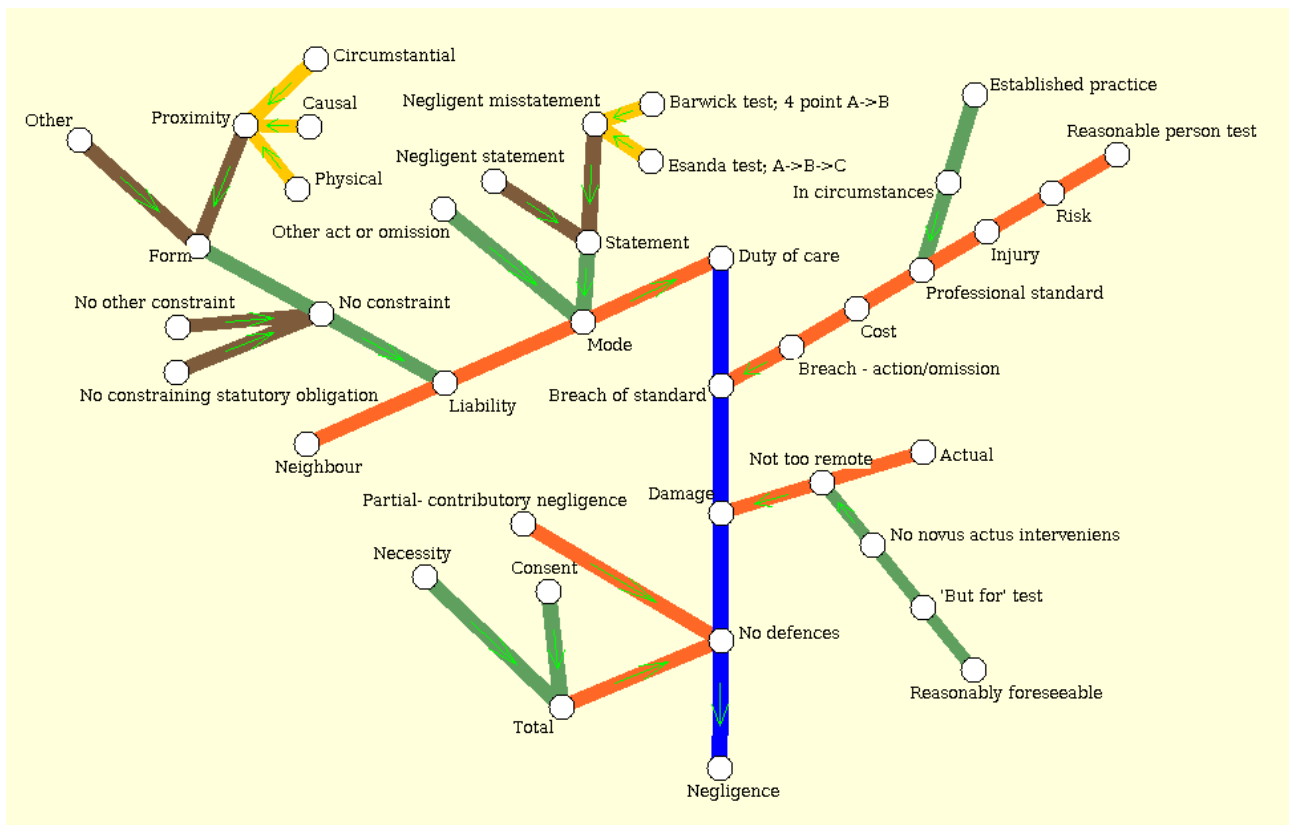
Figure 1: Negligence

2. Once the River system is constructed, the builder can add glosses to link rule antecedents to any relevant information that would expand understanding of the rules, including exact pages of relevant black letter law databases such as AustLII.

3. The final task is to construct the interrogation system; this involves formulating a question for each rule antecedent and identifying the possible answers. Notes on the questions and available glosses that assist answering, may be provided in the interrogation system. Identification of possible answers includes standardised identification of the consequences of each answer. If no answer is selected, the logic automation applies the provision for this in its automated four valued truth table.

After these three construction tasks, namely, rivers, glosses and interrogation, the app can be consulted. A consultation may be saved and retrieved as a report.

eGanges River maps are the structure of rule systems derived from case dicta or statutory statements pieced together according to the hierarchy of detail that is created by the nature of language and/or authoritative determinations of the judiciary or legislature. Each river in the tributary system of rules represents a formalised rule: if (antecedent(s)) then (consequent). Where an antecedent in one rule is also the consequent in another rule which more closely defines that antecedent, a tributary system like a river system is created.

Where the rules provide for the exercise of discretion, an antecedent contains that discretion, e.g. 'mitigation' in regard to determination of penalty. The discretion antecedent can then be glossed with a spectrum of (1) precedent cases, for instance for the negative finding of no mitigation, (2) precedent cases for the positive finding mitigation allowed, and (3) hypothetical cases that are not yet decided, and therefore uncertain that mitigation would be allowed.
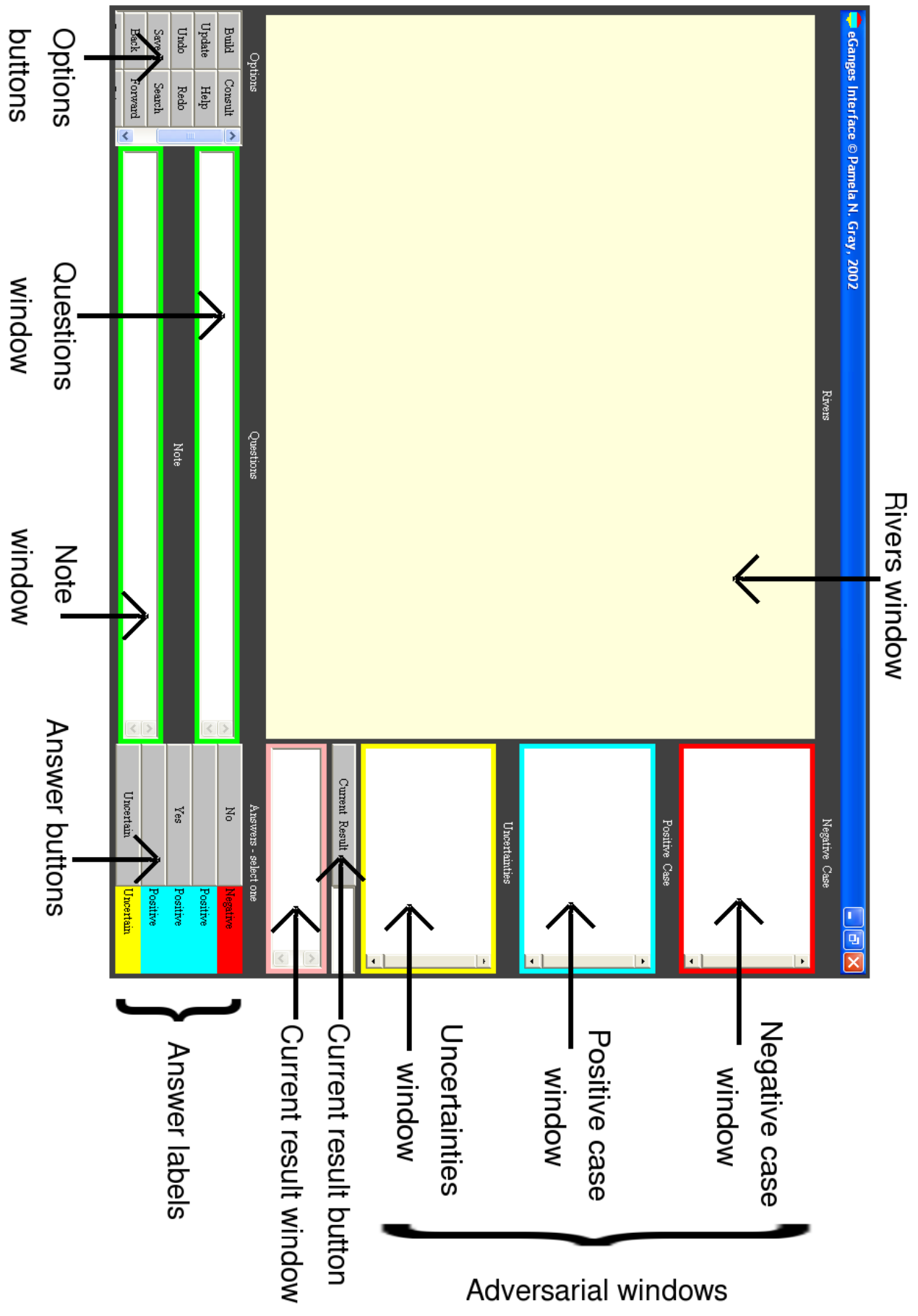
Figure 2: eGanges Interface

4. Library of legal superexpert systems

Grays Institute was founded by Dr Gray in 2013 as a registered Australian charity with the purpose of constructing a free online library of legal superexpert systems at: http://www.graysinstitute.org

If the development of applications were undertaken by government administrators, these could be added to the library so that the Australian collection would expand rapidly. These applications could then facilitate the operations of administrators, as well as provide quality control, efficiency and proficiency to their work. At the same time, they could assist all Australians to understand the law better and to more easily comply with its complex requirements; this access to the law would better permit people to receive the benefits of legal compliance.

Through the library, a range of economic, social and environmental issues affecting the welfare of Australians could be clarified and managed with scientific precision, and assist the formulation of better policies, in the long term interest of the Australian community.

Expansion of the library is currently undertaken by the trustee, Dr Gray, and other concerned individuals, with her assistance. A free copy of eGanges is provided to application authors, by arrangement with Grays Knowledge Engineering (http://www.grayske.com), the sole proprietor of which is Xenogene Gray. Technical instruction and support can also be provided to authors by Mr Gray who is a qualified teacher and trainer.

There are currently three superexpert systems in the online library, all of which may be accessed and trialled, as long as the user has Java available on the computer used to access the systems. A fourth superexpert system is currently under construction with a Chinese lawyer, namely the NSW dangerous driving offence. On satisfactory completion of this application, the Chinese lawyer, who is also a qualified interpreter, will construct an eGanges app for the corresponding offence in the Chinese criminal code; this app will commence the Chinese collection of the library.

Other applications are also under construction, including an administrative law application and the first of the international law collection, the United Nations Convention on Contracts for the International Sale of Goods (http://trove.nla.gov.au/work/3901700 (pp.384-397))

5. Civil dispute resolution

The current inquiry into Australia's system of civil dispute resolution, with a focus on constraining costs and promoting access to justice and equality before the law, is served by the eGanges software.

As noted, Australia's system of civil dispute resolution is beyond the means of most Australians, due to their lack of access to complex law and the high cost of obtaining this access. Applications in the online library provide fast, user-friendly, free access to the law. This access to law may prevent civil disputes from arising, quickly resolve existing disputes, or quickly determine the issues of fact or law that require judicial resolution.

When Dr Gray last practised law, she had her own legal practice in Darwin, N.T. in the 1980s. Most of her clients were turned away by the high cost of litigation and the associated risk of losing in the pursuit of justice. This same reality applies in Australia today, as noted:

> The hard reality is that the cost of legal representation is beyond the reach of many, probably most, ordinary Australians … In theory, access to that legal system is available to all. In

practice, access is limited to substantial business enterprises, the very wealthy, and those who are provided with some form of assistance. (Chief Justice of Western Australia, Wayne Martin 2012, p. 3)

There is always a risk of losing in litigation, due to:

1. uncertainties of evidence and proof;
2. hidden or disguised judicial bias;
3. engaging persuasion of advocates;
4. mistakes, omissions or negligence of advocates;
5. unresolved issues of law, gaps or uncertainties in law;
6. the exercise of judicial discretion;
7. unexpected factors or complications.

Even if *pro bono* services are given, the risk of liability for costs of the opponent remains. For a well-functioning justice system, access to the system should not be dependent on capacity to pay, and vulnerable litigants should not be disadvantaged. Free access to the law, through the eGanges technology, can provide a well-functioning justice system, providing timely and affordable justice. This means delivering fair and equitable outcomes, as efficiently as possible, and resolving disputes early, expeditiously and at the most appropriate level. A justice system which effectively excludes a sizable portion of society from adequate redress, risks considerable economic and social costs.

In 1993, a Californian company, North Communications, developed Quick Court technology which was installed in the foyer of a court in Arizona. It had touch-screen options for menus and an alphabetical keyboard. The on-screen host, Victor, guided users to access legal services and documents. Access to an online library of superexpert legal systems, may be from any available computer at any time. It is currently being adapted for android mobile technology.

eGanges apps assist in the determination of specific issues of fact and issues of law in a dispute. This would allow a litigant to negotiate professional assistance only for those issues, and thus minimise the cost of the litigation. This partial representation could be provided for as part of 'unbundled' legal services billing that could improve access to civil justice in Australia.

As noted, while concerns about accessing justice are commonly centred on costs, an accessible civil justice system implies dispute resolution processes that are widely available and well understood. eGanges apps could support and reduce the costs of alternative dispute resolution, especially if the apps were authored by government agents or ombudsmen.

eGanges can assist dispute resolution and lower its cost. It may change the nature of dispute resolution by assisting the parties to agree on their legal and factual differences from the outset.

6. Report NO. 46 on *Automated Assistance in Administrative Decision Making*

As noted, over the years, there has been a steady stream of official reviews and reports, some broad ranging and some on single issues, aimed at improving access to civil justice. As noted by Ronald Sackville:

At almost any given time in Australia, there is an inquiry under way into access to justice or consideration is being given to the latest report on the subject. (2010, p. 12)

In 2004, the Administrative Review Council Report NO. 46 to the Attorney-General on *Automated Assistance in Administrative Decision Making* identified 27 Principles by which to ascertain the

suitability of expert systems for administrative decision making. eGanges deals with these principles as follows:

1. *Expert systems that make a decision – as opposed to helping a decision maker make a decision – would generally be suitable only for decisions involving non-discretionary elements.* Where a discretion is provided for in a legal rule system, eGanges allows for glossing of relevant precedent cases/decisions, as retrievable data, in a spectrum of circumstances that have had a positive result, circumstances that have had a negative result, and hypothetical circumstances that remain uncertain. The application of the rules is automated subject to the exercise of the discretion at the point in the rules where that is required.

2. *Expert systems should not automate the exercise of discretion.* eGanges does not automate the exercise of discretion, but it does automate the result of the exercise of the discretion, as input, in relation to the non-discretionary parts of a rule system.

3. *Expert systems can be used as an administrative tool to assist an officer in exercising his or her discretion. In these cases the systems should be designed so that they do not fetter the decision maker in the exercise of his or her power by recommending or guiding the decision maker to a particular outcome.* eGanges applications may be constructed to reveal to the public users, the spectrum of precedents that should guide the consistent decision maker. Glosses can be made available to warn public users of flexibility in discretionary decisions reserved for the administration.

4. *Any information provided by an expert system to assist a decision maker in exercising discretion must accurately reflect relevant government law and policy.* Glosses can be made available to advise public users exactly, of relevant government law and policy.

5. *The use of an expert system to make a decision, as opposed to helping a decision maker to make a decision, should be legislatively sanctioned to ensure that it is compatible with the legal principles of authorised decision making.* The Report defines these legal principles as the 'values of lawfulness, fairness, rationality, openness (or transparency) and efficiency'. This policy may be applied to eGanges applications, and would be expedited if the applications were constructed by authorised public servants or agents. The precision, automation and transparency in the user-friendliness of eGanges applications, would assist in administrative compliance with the values defined.

6. *Before overriding a decision made by or with the assistance of an expert system, the primary decision maker should contact a senior officer to discuss the decision to override the system.* The transparency of the user-friendly interface of eGanges assists in making a decision to override an eGanges application. Examining the application does not require programming skills to search computer code. Ostensible errors in the application can be quickly corrected; they may be found in the graphical river system of rules, the glossing of those rules, or the interrogation system for obtaining user input. eGanges has been verified by M.Phil thesis (http://trove.nla.gov.au/work/159333159) (http://grayske.com/thesis/Xen_Thesis_Final.pdf); validation of any of its applications must be undertaken by the application builder.

7. *The construction of an expert system must comply with administrative law standards if decisions made in accordance with the rule base are to be lawful. Decisions made by or with the assistance of expert systems must comply with administrative law standards in*

order to be legally valid. eGanges can be used to construct applications that comply with these requirements.

8. *The people responsible for constructing an expert system must ensure that it is compatible with their agency's privacy obligations.* Users who consult an eGanges application are not required to provide personal information. They may save and print out their consultation.

9. *Expert systems should comply with administrative law disclosure requirements – in particular, requirements associated with freedom of information and statements of reasons.* eGanges applications may be constructed to comply with these requirements. Processing of applications assist the determination of reasons, by virtue of the feedback windows of eGanges.

10. *Expert systems should be designed, used and maintained in such a way that they accurately and consistently reflect the relevant law and policy.* eGanges is a verified superexpert shell that can be used to standardise expert systems across government departments; construction of the 'rule base' is simplified by ready construction of river system rule maps. River systems have a similar form to Ishikawa quality control fishbones and can be as large as the rule knowledge requires. Processing of the rule maps does not follow a decision tree which requires explicit provision for every alternative combination of possible cases; rather, it automates truth tables to apply the rules to the user input. Applications of the shell may be validated by their authors.

11. *The team designing an expert system should be made up of a combination of people with technical expert systems knowledge and legal and policy experience.* Construction of an eGanges application requires little technical skills and substantial expertise in the substantive law of the relevant field.

12. *Expert systems must be regularly updated and maintained in order to ensure the currency of the information on which the rule base is constructed. The people responsible for maintaining an expert system need a detailed knowledge of the system.* This principle is clearly founded on rule base coding technology which has been superseded by the eGanges superexpert shell. An eGanges river system of rules can be visually navigated speedily for any user to acquire a detailed knowledge of the system; updating and maintenance of the system can be readily and speedily implemented.

Principles 13 – 27 are also founded on rule base coding technology which has been superseded by the eGanges superexpert shell. These principles should be reviewed in the course of carrying out the pilot study proposed in this submission.

It is submitted that adoption of eGanges smart law aids, can most add value to access to justice and provide focus on those matters that are likely to provide the greatest benefit to the wider community through this reform.

As noted, civil law defines rights and obligations in many areas of daily life — such as family relationships, education, employment, money, debt, injury, health, housing and dealings with governments. So, civil legal issues and problems are relatively common and can arise under Commonwealth, state and territory laws. eGanges applications can be constructed for legislation, subordinate legislation, bills, case law or combinations of these, for both civil and criminal matters; they can also identify overlaps.

7. Intelligent front end to AustLII

AustLII acknowledges that eGanges provides an intelligent front end to their black letter law databases and that this is a worthwhile addition to expand access to law.

If the Commission is particularly interested in understanding which disputes should be resolved formally, and perhaps more importantly, how the number of such disputes can be appropriately minimised and how other matters can be kept out of more formal processes, then it is submitted that eGanges applications available to the public through a free online library of legal superexpert systems of a registered Australian charity, could minimise disputes requiring formal process.

8. Grays Institute

Grays Institute was registered as an Australian charity in 2013, with the purpose of constructing a free online library of legal superexpert systems. Its trustee is Dr Pamela N. Gray. The charity offers free copies of the eGanges shell to specialist lawyers and law students in return for applications for the library.

The Honorary Advisers of Grays Institute include leading experts in the field of legal expert systems in the USA and Europe:

Marc Lauritsen,
Professor Giovanni Sartor of the European University Institute
Professor Eric Schweighofer of Vienna University,
Associate Professor Scott Mann of University of Western Sydney, Law School
Christopher Enright,
Wayne Guild,

The charity's website provides a forum for discussions between the Advisers and the trustee.

9. Beneficiaries of the library

1. Public servants – for quality control of all levels: local, state and federal; eGanges applications can be constructed for legislation, subordinate legislation and case law.
2. Public
3. Students
4. Litigants
5. Private agencies such as the Watchdog for fraud and money-laundering, Salvos Legal, and community legal advisory centres.

Public servants who develop, use, or are assisted by the automated services of eGanges applications will provide smarter, more efficient bureaucracy and services.

Public libraries now offer computer access and Wi-Fi for library users to access the web. This will increase public access to the charity's online library.

Students will more readily learn the law, and its application to cases through the eGanges streamlining and automated application of rules.

Potential litigants who consult eGanges applications may be better informed in deciding on litigation and the resolution of their legal dispute. This may reduce legal needs which are defined as

'legal issues that individuals have not been able to resolve effectively by their own means (Johnsen 1999 cited in Currie 2007)'

10. Why would the federal government want to adopt and use eGanges?

1. It is free.
2. It complies with the 2004 report recommendations.
3. It has user friendly construction and consultation – no pseudo coding to be learned.
4. It offers quick construction and consultation of applications.
5. It manages massive, complex rule hierarchies by River/fishbone visualisation.
6. It automates complex, massive, adversarial combinatorics.
7. It offers easy and fast maintenance of applications.
8. Training and support are readily available by a qualified teacher and trainer.
9. It achieves quality control for the public service.
10. To support the development of an intelligent front end for AustLII.
11. To support Australian leadership in international smart law.
12. To assist business, especially SMEs.
13. To prevent or minimise legal conflict.
14. To reduce costs of legal conflict.
15. It has only small storage requirements of eGanges and its applications.
16. To allow speedy access to the law and justice.
17. To provide quality control of access to justice.
18. To improve knowledge of requirements of law and the benefits of compliance.
19. To make massive, complex law more sustainable.
20. To reveal improvements to rule systems of law and justice for determination of law reform.

As noted, improving the clarity and accessibility of laws can allow people to better identify, and act in accordance with, their legal obligations and rights. Similarly, legal information that is clear and accessible makes it easier for people to resolve their own disputes.

11. Why is access to justice important?

As noted, the ability of parties to access appropriate, timely and efficient dispute resolution pathways is important from both an individual and societal perspective. The direct benefits of accessing justice accrue to individuals by enabling them to effectively and fairly resolve their disputes and enforce their legal rights.

But also noted, there are indirect benefits to the broader community. Individual judicial decisions uphold and shape the economic and social relationships between people, organisations and governments, and create valuable precedents so other disputes can be resolved more efficiently — improving certainty and reducing the risks and costs involved in transactions.

Further noted, in complex areas such as tax and social security, legal issues can arise from a lack of understanding of the law, leading to unintended violations and preventable escalation of disputes. Access to legal education and information can also help people deal with disputes informally and early. In the legal assistance sector, community legal education is used to inform people of their legal rights, responsibilities and options prior to, or at the outset of, any legal problem with a view to avoiding or minimising the impacts of disputes. An eGanges free online library of legal superexpert systems is posed by the charity as an educational service to the Australian community.

12. Social Superexpertise

It is submitted that the eGanges paradigm has the potential to increase the personal and social intelligence of the community. Vast, complex intelligence can be visualised and better comprehended, as a precedent for enhanced thinking and understanding. This upgrade is vital in an age of science which has many remaining vestiges of medieval life.

References

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