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1 Introduction

1.1 Definition e-health
There are several definitions of e-health. The European Union for instance defines it in the following way: “e-health describes the application of information and communications technologies across the whole range of functions that affect the health sector” (EU 2004, p. 4). This is a very broad definition but as the term e-health is also very broad, it can be considered adequate. E-health comprises very different aspects, from pure information in electronic form to telemedicine (consulting, treatment, even surgery via information technologies), e-prescription and electronic drug management, electronic patient health records, etc.

Gunter Eysenbach tries to find an academic definition of the term that according to him “has rather been introduced by marketing leaders than academics”: “e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology” (Eysenbach, 2001). Eysenbach’s description is definitely more exact and responds to the fact that e-health is a rather new phenomenon. Besides health services, he especially mentions health information, which will be the main subject of this paper.

1.2 Health information on the internet and the need for quality assurance
Websites containing health information are among the most frequented sites. It is only logic that with growing interest and demand for medical information, the number of information providers and the amount of information also increases and entails a growing part of wrong or even potentially harmful information. Actually nothing else but a computer and internet access are necessary to support a website. Due to this easy way to provide own information, many sites have emerged and still do emerge. The thousands of websites with medical information are of very different quality. It can be quite difficult for users to discern among professional and non professional sites. But users searching for health information on the
internet often rely on the information they find and may even take decisions whether to see a doctor or not on the basis of such information.

Even when the provided information is of high quality, different aspects can nevertheless lead to information seekers being harmed. Reasons can be language barriers, inappropriate contexts, interpretation difficulties for laypersons, accuracy and currency of information, etc. It is thus necessary to find mechanisms that help users to control and assure quality of information on such websites but also to help website providers to offer high quality information. (Risk/Dzenowagis 2001)

2 Quality assurance mechanisms

There are different approaches that try to grant quality information or at least try to help to discern quality information from potentially harmful information. Some of them will be presented in this section with practical examples to each approach.

2.1 Codes of conduct

Codes of conducts are a set of quality criteria, usually established by groups of experts, that the website provider (e.g. an organization) decides to follow by regularly assessing the own website against the criteria. The provider does that on a voluntary basis and no one supervises or controls the website’s accordance to the code. This quality assurance device is depending on the provider’s and the organization’s goodwill and as mentioned above, it has no effective enforcement mechanisms. The only situation where enforcement might be possible is if an umbrella organization that the website provider is part of established the quality criteria. Then it is in the organization’s interest to regularly check its member’s websites.

A major point that is part of most codes is for example that it must be clear where the information is coming from, this means: name and contact address of the website provider, names and correspondence addresses of the different authors, references to information sources. Another point is that it must be made a clear distinction between advertising and health information content. Related to that, it is also important to display financing sources.

2.1.1 EC Quality Criteria for Health-related Websites

The European Union is very active in the field of e-health and so are many of its member states. One the one hand, the EU holds a group responsible for e-health within the program
Within the strategic framework of eEurope2002\(^1\), the European Commission drafted the “Good Practice Guidelines for the Health Internet”, a guide on how to develop codes of conduct, with the idea that member states of the European Union would develop such codes of conduct on its basis. However, shortly after, the European Union supported an initiative to develop an own code of conduct, a set of “Quality Criteria for Health Related Websites” which were issued in 2002. The quality criteria should be used as recommendations when developing health related websites and they can as well be used as a basis in the development of quality assurance tools such as user guides (see 2.3), voluntary codes of conduct, quality labels (see 2.2), accreditation systems (see 2.4), or similar. However, the committee states that the aim was only to develop a set of quality criteria and that no methods of implementation have been developed so far.

As already mentioned, these quality criteria should help to develop and maintain health related websites independent from their content and target audience. The most important quality criterion, according to the Commission, is that it is clearly stated to whom a specific site is addressed and that its content and design are appropriate to the targeted audience. Further criteria are transparence (identity and aims of the information provider, financing sources), authors identification, data protection and security, information update (date and time of updates should be mentioned), responsibility, and accessibility. (European Union 2002)

2.1.2 eHealth Code of Ethics

The e-Health Code of Ethics has been drafted as a result of the "e-Health Ethics Summit". 50 experts from all over the world participated in the Summit that took place in the beginning of 2000 in Washington DC and that was organized by the Internet Healthcare Coalition and hosted by the World Health Organization/ Pan-American Health Organization (WHO/PAHO). The final Washington e-Health Code of Ethics sets forth guiding principles in eight categories: candor, honesty, quality, informed consent, privacy, professionalism in online

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1 i2010 is the current EU Initiative in the field of electronic governance, the first initiative was eEurope2002 which was later followed by eEurope2005.
health care, responsible partnering, and accountability (Rippen/Risk 2000). However, the eHealth Code of Ethics does no longer exist (Boyer 2007)

2.1.3 Advantages and disadvantages

Codes of conducts are relatively easy applicable and of no cost for the information provider. However, a disadvantage of such codes is that “the burden […] in general is ultimately passed onto the citizen. In the absence of real enforcement citizens are required to be interested, knowledgeable, and caring, with the desire and commitment to apply critical appraisal of sites proclaiming to be in compliance of a particular code.” (Risk/Dzenowagis 2001) Each information provider can claim to follow a code of conduct and in order to be sure if this is true, the only possibility for the information user is to check it himself.

Another problem might be that too many codes of conduct coexist as this may be confusing for the health information user. How can a user know which codes are reliable, as in principle, everyone can establish a code. Even though basically, those codes all comprise similar quality criteria – such as disclosure of authors, dates for contributions and updates, references, financing sources, etc. – it would be more favorable, in my opinion, to have only one or at least a few general codes with a largely known reputation. The eHealth Code of Ethics and the HONcode presented further down can be considered as best practice examples of widely known reliable codes of conduct.

2.2 Quality labels (self applied or awarded by third parties)

Website providers can stick a quality label to their website in order to demonstrate the users that the site is adhering to a code of conduct and that the information provided is trustworthy. Self applied labels can be placed by the website provider himself, whereas in order to receive a third party awarded label, the website has to be controlled and rated by an expert panel.

Third party accreditation is a more advanced approach to rate information quality, as an independent third party reviews the site and checks its compliance to given quality criteria. This gives further assurance to the website user. In order to be accredited such a quality seal, the website provider has to send a request to a rating agency. Then, experts review the website, evaluate and rate the quality of the provided information according to a set of criteria. After the review, the website provider may get some recommendations for parts that he has to change, adapt or add (e.g. give authors’ names, dates to the entries, etc.). Once the
required changes are made, the provider obtains a trustmark from the rating agency which he can place on the website.

2.2.1 Hi-Ethics code

The Hi-Ethics code has been developed by the Internet Health Coalition, which was at that time together with URAC (see 2.2.3, both from the USA), one of the best known expert groups in the field of e-health. The code demands of websites providers to clearly distinguish advertising from health information content and to clearly disclose relationships between commercial sponsors and health information content (Charatan 2002). Website providers who decided to follow the code could themselves apply a quality label to their website. From the fact that no recent information after 2002 on the Hi-Ethics code can be found and that the former website is not valid anymore, it is concluded that the Hi-Ethics code does no longer exist.

2.2.2 HON

HON (Health on the Net Foundation) is probably the oldest quality label. The Foundations’ origins go back to a conference in 1995 with the title “The Use of the Internet and World Wide Web for Telematics in healthcare”. The organization is located in Geneva and has the status of an NPO.

Today, the Health on the Net Foundation is one of the best known quality labels for medical information on the internet. The Foundation established the HONcode, a code of conduct for health related websites comprising 8 quality criteria translated into 34 languages: authority (give qualifications of authors), complementary (information to support), confidentiality (respect the privacy of site users), attribution (cite the sources and dates of medical information), justifiability (ability to back claims), transparency (accessibility, provide valid contact details), financial disclosure (provide details of funding), advertising (clearly distinguish advertising from editorial content).

Website providers that decide to adhere to the HONcode can attach the HON-label to a prominent location on the site. In order to do so, they need to apply formally and sign a commitment to follow the HONcode. Then a team of health professionals browses the website and checks its accordance with the code. If the website is considered to be of sufficient

\(^2\) after 2002
quality by the experts, the provider is given the right to place the HONcode hyperlink seal on his website. By clicking on the seal, the website user is transmitted to the HON website where he can check the codes’ requirements.

**Figure 2.1: HON quality seal**

![HON quality seal](http://www.hon.org)

At HON, a team of experts regularly performs random checks on HON accredited websites about once every year, to reassure that the content and eventual changes on the website are still adhering to the HONcode.

Websites that received the HON-label are stored in a directory and the site comprises a search function, where all these HON approved websites can be browsed. 5000 websites are currently using the HONcode and only in the last month, 70 new sites have been certified with the HON-label.

In 2004, HON won the eEurope Award for eHealth in the category “eHealth Information tools and services for citizens”. These eEurope Awards were distributed from 2003-2005 and their aim was to promote the exchange of best practices in the fields of eGovernment, eHealth and eLearning. The awards highlighted efforts in Information Technologies to improve the quality and accessibility of public services. (eEurope Awards 2008)

HON is one of the oldest quality labels, it is maybe even the oldest but it is also one that survived many years and that still develops. It recently started a collaboration with Google, for Google’s new offer Google Co-op. This program enables the users to restrict search results to quality assured websites (for instance that only sites with the HON label are displayed).


2.2.3 URAC Accreditation Program

Another quality label is awarded by the URAC Accreditation Program. URAC was founded in 1990 and it originally stands for “Utilization Review Accreditation Commission”. It is an American agency and it is the largest accrediting body for health care. URAC is a general agency, accrediting different types of health care organizations such as medical management organizations (labels “case management”, “disease management”), “health call centers”, hospitals and, important for us, “health websites”. (URAC 2008)

Figure 2.2: URAC Quality Seal

![URAC Accredited Seal](http://en.wikipedia.org/wiki/Image:URAC_Accreditation_Seal.jpg)

It has to be noted though, that URAC accreditation is quite expensive. A company interested in being awarded with the URAC trustmark has to pay accreditation fees from 2000$ to 5000$ whereas for instance the HON membership is free of charge. It seems likely that thus only large organizations can afford the URAC quality seal. (Risk/ Dzenowagis 2001)

2.2.4 Advantages and disadvantages

The approach of self applied labels has the same problem as the code of conduct. As there are no enforcement mechanisms and no real controls, a provider can just place a quality assuring seal without actually following the according code of conduct. But even for third party accredited labels the website provider could actually just copy the quality seal and place it on the site. This is very difficult to find out for the organization providing the trustmark and even if they do find out, there is no real legal background to fight against that phenomenon. It is thus again the information seeker who has to check if the site is really following the code.
2.3 User guidance systems

User guidance systems as quality assessment measure function with a link to a guidance tool which enables the user to check on his own if the information he found is conform to preset quality criteria. This link is similar to a quality assuring label, with the difference that here, the idea is that the user does not just “rely on the label” but check himself if the information provided complies with specific quality criteria. By clicking on the link, the user finds a series of questions that help him to check the site and evaluate the information quality. (Wilson 2002/ HON 2008) The Health on the net foundation HON offers on its website an online checklist which helps information seekers to assess whether a site follows to the HON code principles. Further examples for such tools that can either be general or specific to a particular type of information are DISCERN, NETSCORING and QUICK.

2.3.1 DISCERN

The DISCERN project was launched in 1999 and it is an example for a specific user guidance tool. It provides a brief questionnaire developed by experts which “provides users with a valid and reliable way of assessing the quality of written information on treatment choices for a health problem” (DISCERN 2008). The DISCERN checklist consists of 15 questions for 15 different quality criteria and an overall rating. The questions are organized in three sections, that is: the reliability of the publication and the trustworthiness of the information source (questions 1-8), specific details about treatment choices (questions 9-15) and the overall quality rating which has to be answered after the 15 other questions and according to personal judgment. All answers have to be given on a 5-point scale. DISCERN recommends information providers to answer the DISCERN questionnaire and review it with someone who is experienced with DISCERN. Then the provider can make the results publicly available in the manner of a quality label. (DISCERN 2008)

2.3.2 NETSCORING

NETSCORING is a more general user guidance system seeking to give guidance on the trustworthiness of health-related information, which splits the quality criteria into eight categories: credibility (source, name, references, author, etc.), content (quotations, mentioning of omissions and exclusions, etc.), links (from/ to other sites), design, interactivity, quantitative aspects, ethics, and accessibility. The questionnaire contains 49 quality criteria
which are rated as very important, important and minor criterion. (Centre Hospitalier Universitaire de Rouen 2005)

2.3.3 QUICK

The QUICK tool is an example for user guidance systems targeting particular user groups. It is a tool especially for children. It is easy to handle, very colorful, contains quiz-questionnaires, cartoons and understandable explanations and so guides children playfully to assess information on health related websites. (QUICK 2008)

2.3.4 Advantages and disadvantages

Guidance tools and systems are often used by national health portals, but they are also helpful for website providers when developing a new site, as they comprise clear indications, definitions, and standards of quality information. Such tools expect a lot from the information seekers, who are expected to be reasonable and attentive citizens taking time and effort to check the information they are willing to use. This fact might weaken the user’s incentive to make use of the device. However, it might be considered a better solution than the so far described codes of conduct and self applied labels, in so far that it is clearly stated that the user himself has to check the trustworthiness of the information and that there is no guarantee of the information’s quality. It does thus not give a wrong sense of “security”, which means it does not mislead the user with apparently trustworthy quality labels that do not or barely include enforcement mechanisms.

2.4 Filtering tools

Filtering tools classify and group websites according to certain predefined quality criteria. They are often based on a gateway approach to organizing internet sources. Websites are selected according to their quality and relevance. They are reviewed by an expert panel that attaches metadata descriptions (see 2.5.1.1) to the resources in order to classify the websites in a structured database. This helps users to get quick access to information sources reviewed by experts. Such filtering tools often have a large directory of health related websites which can improve search results in view of precision and accuracy. (Wilson 2002)

The above described Health on the Net Foundation HON, could also appear here, as in addition to the awarding of its label, it also stores the HON accredited websites in a directory, where health information seekers can browse in order to find accurate information.
2.4.1 OMNI Biome

OMNI stands for Organizing Medical Networked Information and the project has already been launched in 1996 by the UK Joint Information Services Committee. The OMNI group developed its own “Evaluation Guidelines” according to which information resources are described and listed by specialists (Risk/ Dzenowagis 2001). The directory containing all the evaluated websites can be browsed by keyword or in an advanced search, by resource.

The OMNI gateway does still exist; it is now part of the INTUTE health & life sciences website, which is accredited with the HON quality seal (INTUTE 2008).

2.4.2 Advantages and disadvantages

It is relatively cost and labor consuming to establish such filtering tools, as experts need to locate, review and classify information in order to enter it into the database. In addition, regarding the huge amount of websites and the big number of new sites appearing every day, it is almost impossible to develop a websites directory reaching all these sites. Permanent updates of and additions to websites already stored in the directory also require much time and effort as they need to be regularly controlled in order to assure quality. It might also be a problem that some experts are in the position to define what high or low quality information is. As different information can be of different use for different persons, what an expert might class as low quality information can nevertheless be of interest for a specific user. It has to be noted though that for the mentioned filtering systems, the websites are evaluated according to generally valid, objective quality criteria.

A positive aspect of this tool is for instance that the information seeker can search within a specific framework of only medical information which prevents him from much useless information. And that he can be rather sure that the information he finds within that framework will be trustworthy (Wilson 2002).

2.5 More recent approaches

2.5.1.1 Metadata vocabulary and content description

One possibility of classifying information is to tag it with a metadata vocabulary. Many filtering tools use this approach. Meta data or meta information means “information about the information”. There are metadata vocabularies designed especially for health related websites,
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In order to enhance transparency, trust and quality of health information on the web. The vocabulary is designed to provide a computer-readable electronic description of a health related website. The user’s software can "read" the metadata label automatically. It enables the users to see who the responsible website provider is, how the website is financed, and gives other information about the website content, aim and target audience. (Eysenbach et al. 2001)

Numerous such metadata vocabularies exist, the examples mentioned in this paper are MedPICS used by the MedCERTAIN project described further down (see 2.5.3), or HIDDEL which replaced the MedPICS vocabulary later. HIDDEL is an advanced metadata vocabulary intended for use by all three participants in the process of providing, searching and labeling medical information on the internet. The metadata vocabulary may be used be the website provider himself, to tag and describe sources and information on his website or by experts of an independent quality assuring organization who can make comments on the website content and resources. The user himself is also able to use HIDDEL, but he does not directly tag the information on the website, he rather describes his individual information needs. This enables the user to find information exactly fitting his needs. The quality of the information is then described as the gap between the consumer needs defined by the information seeker and the metadata supplied by the website provider and/ or the independent third party rating. The larger this gap the lower is the quality of the information for this specific user. This personally adapted quality notion might be a very promising approach.

It could be considered problem, that as with codes of conduct, many different metadata vocabularies exist. It would be much easier and clearer if one major vocabulary for all websites existed. As Mayer et al. 2006 state “Up to now there is not working a standard […] schema for medical web sites”. However this statement shows that there is at least a will to have a standard meta data vocabulary and by bringing experiences from former projects together, Mayer et al. are trying to develop such a standard vocabulary. (Eysenbach et al. 2001; Mayer/ Karkaletsis 2006)

2.5.2 MEDCERTAIN

MedCERTAIN (Certification and Rating of Trustworthy and Assessed Health Information on the Net) was a project of the European Union that started in 2000. It was also a labeling project aiming to place a trustmark and help users to discern reliable health information, but
with a slightly different approach. The evaluation of health related websites should be made by experts from a decentralized infrastructure. “The aim was not to have a central institution that decides on what information is good or bad”, emphasized Gunther Eysenbach, the project leader. (Innovations-report 2000)

Figure 2.3: MedCERTAIN trustmark

![MedCERTAIN trustmark](http://www.uni-heidelberg.de/presse/news/2010cybermed.html)

The first step was a health conference with 80 participants from 21 different countries, where experts and patients established a set of quality criteria.

The website quality assessment comprised 3 levels of certification. To get a Level 1-Trustmark, the participating websites had to commit to the “Washington code of eHealth ethics” (eHealth Code of Ethics) and place certain information about the website provider, the authors’ qualifications, financing of the website, internal quality assurance, etc. in a database. If a website provider held the Level 2-Trustmark, this meant that the information stored in the database was checked and that the websites was regularly visited and that it was controlled if the site adhered to some formal criteria. In order to get the Level-3-Trustmark, the websites contents were checked by experts and medical associations, who gave their recommendations. (Eysenbach et al.1999)

### 2.5.3 MedCIRCLE

MedCIRCLE was a more recent project, building on the technology and the experiences made with MedCERTAIN. It was also based on the concept of meta information (see 2.5.1.1). MedCIRCLE implemented the metadata vocabulary "HIDDEL (Health Information
Disclosure, Description and Evaluation Language)" (see 2.5.1.1) and replaced the MedPICS vocabulary that was used in the MedCERTAIN project. The MedCIRCLE project tries to encourage other similar gateways, portal sites and rating services to also make use of their newly established metadata vocabulary. (MedCIRCLE 2008)

Figure 2.4: MedCIRCLE Logo

Source: http://www.medcircle.org/infobar/images/medcirclelogo-central.jpg

2.5.4 MedIEQ

The quality initiatives mentioned so far basically rely on three different mechanisms: Codes of conduct/ ethics, third party certification or tool based quality evaluation. Many of them already contain more than one element (e.g. HON: code of ethics, self applied label and integrated filtering tool (its health website directory)) and Risk/ Dzenowagis conclude in their analysis and comparison of different health information quality initiatives that promising quality programs will probably comprise all three elements. (Risk/ Dzenowagis 2001)

The MedIEQ project started in 2005 and it is the most recent European project for quality labeling, which continues the work of its predecessors MedCERTAIN and MedCIRCLE.

One big problem for all currently used labeling mechanisms is that information on the internet can be changed, added and deleted very easily and that it is very difficult to keep the pace with controlling and assessing this information. It is a big effort and a challenge to continuously review the information but nevertheless important if the quality seals are to be taken seriously. In the labeling system described and aimed for in the MedIEQ project, the time consuming checking and reviewing processes but also the process of locating new websites are meant to run automatically.

The MedIEQ project wants to bring all promising approaches to quality labeling together to develop a new mechanism. One of these approaches is a third party quality rating (see 2.2).
The MedIEQ approach has different quality levels like the MedCERTAIN project had. The website provider has to send a request for a label, and to auto-check the website’s accordance with a certain code of conduct (Level 1). Then, a committee assesses the website based on the same Code and if necessary sends recommendations to the website provider who then implements these recommendations (Level 2). After implementation of the recommendations, the website receives a seal code which can be posted on the website. The quality seal is a hyperlink which transmits the user to the according Code of Conduct. When a site receives the level 2 trustmark, its name and URL are added to an index of accredited websites.

**Figure 2.5: MedIEQ Quality seal**

![MedIEQ Quality seal](http://ec.europa.eu/health/ph_projects/2005/action1/docs/Medieq_criteria_en.pdf)

Another mechanism that is integrated into the MedIEQ approach consists of website selection and classification in four different categories, namely treatment information, background information, counseling information and medical information. The selected information is labeled with metadata vocabulary in order for websites to be classified and stored in the database according to these criteria. The two major approaches that the MedIEQ project wants to bring together in order to create a more modern and less time and labor consuming labeling mechanism are thus third party rating and content description.

The proposed labeling system MedIEQ must comprise different tasks which all need to be automatic to the largest extend possible. First, it must crawl the internet to find interesting websites. A second function is spidering the information contained in the spotted sites for evaluation and classification. This spidering function also contains the scoring of hyperlinks which in turn leads to new pages being discovered. The next step is information extraction. This means that the pages are processed and information relevant to the labeling criteria is searched and retrieved. That could be for instance author’s names, organization name, contact address, etc. Finally the last point, data storage; the extracted information is stored in a database (MedIEQ Database). Figure 2.6 pictures the MedIEQ Architecture.
Sites that do not meet the required quality criteria are filtered and their information is stored in a separate database. Such sites will be examined by labeling experts who will decide whether the website is added or excluded from the directory. The regular reviewing process of already listed websites is also running automatically: the labeling system checks whether the information stored in the database is still valid and if this is not the case, it automatically updates the stored information and sends a notice to the labeling expert. In case of another control being necessary, the expert performs the control and decides again whether the website will stay in the directory or whether it has to be withdrawn.

Figure 2.6: MedIEQ architecture

Source: Mayer/ Karkaletsis 2006
There have been numerous projects to define medical metadata vocabulary such as the EC Quality Criteria for Health related Websites or also the previously mentioned HIDDEL. MedIEQ wants to put forward a new, specific metadata vocabulary making use of the experiences gathered during these projects. As the project team members outline, their aim is “not to suggest this vocabulary as “the only one to use” but to show instead the value of machine readable labels. So, “the emphasis is on the technology and not on the terms (criteria) included in the vocabulary” (2nd MedIEQ interim report, Feb. 2008).

3 Difficulties and challenges

One major problem concerning all the above described quality assurance mechanisms is that they can hardly be enforced. In the absence of credible enforcement mechanisms, no program can be virtually reliable and trustworthy. As we have seen, providers can say to adhere to a certain code of conduct or attach a self applied label to their website even if they do not comply with the quality requirements. Without functioning enforcement mechanisms, quality programs might give a false feeling of security and lead people to trust in potentially harmful information. Most quality assurance mechanisms are thus dependent on educated, interested, and active citizens who critically judge information and do not just believe anything they read.

As we have seen, it is very difficult to control the enormous amount of available health information in the first place, but it is almost more difficult and time consuming to regularly check the rapidly changing information offer. With the MedIEQ project, a promising new mechanism concerning regular website content control and enforcement mechanisms is elaborated. Websites not adhering to the quality requirements are simply excluded from the register and as much of this is done automatically, a lot of time and money can be saved.

However, this fact leads us to the next problem. As already mentioned in the evaluation of the individual quality assurance mechanisms, quality is a wide notion which encompasses different aspects. There are various “quality stages” and especially filtering tools do not take this fact into consideration as they have to either fully accept or reject a specific website. Civan and Pratt discern four different quality dimensions. Content Quality describes the scientific accuracy of provided health information (Civan/Pratt 2004). This quality dimension is very difficult to assess automatically, as the computer does not “understand” the content of a text. However, if the content is backed up by study methodology, references and the like,
there is a chance of assessing it automatically. Otherwise expert reviews can confirm the content quality of a text. Usage quality can be measured by the number of links pointing to the page. If for instance a text is cited on many other sites with links pointing to the website in questions, this enhances the usage quality of a website. Authorship quality can be derived of data such as presence of an author, author qualifications, institution, etc. Finally, publication quality is measured against experience and reputation of the health information provider.

It is an important approach to measure quality in an objective way, as it is very difficult to decide where quality information ends and where non quality information begins without such a scientific basis. Some user guidance systems and for example the metadata vocabulary approaches better come up to this challenge, as they do only rate general criteria (disclosure of sources and authors, dates, provider details etc. and do not make any quality ratings on the information content.

Another important problem is the language barrier. Especially in the European Union, so many different languages are spoken and so much information in all these different languages is available that the quality assurance gets even more complicated than it already is due to the above mentioned reasons. Many quality assurance projects do not address this problem as they are active in the USA, where language does not constitute a major obstacle. MedIEQ is designed to fulfill its information extraction and classifying in seven European languages (Spanish, Catalan, German, English, Greek, Czech, and Finnish).

Furthermore, as already mentioned, many different codes of conduct, quality labels and the like have emerged when e-health started to become important by the end of the 1990s/beginning of 2000. It is arguable if it is necessary to have such a big number of different codes, as they all contain more or less the same requirements. We have seen that many of the codes have already vanished again. One of the reasons might be that it is expensive to maintain such a mechanism as experts are needed not only to establish the initial code but in some cases also to perform regular controls. However it makes probably more sense when a code of conduct is something sustainable.


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