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## Digital Pedagogy - New Perspectives and Approaches

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### *Abstract*

The digital age is different from any other age that preceded it in that it is based first and foremost on technology. Unlike previous periods in history technology played a major role in shaping, and this period is shaped by it. Technology allows us to maintain a community in the absence of a community. There is a paradox here – technology makes it possible to maintain contact between people, and creates a sense of community, but at the same time increases the actual disconnection between community members. Digital technology also appeals to another strong driving force and that is excitement. Create around the technology a sense of the same aura that was lost with the transition to mass and duplicated technology. We are promised a different experience, we are promised that our lives will be better, that we will be more independent, more connected, aware, and important.

*Keywords:* Digital Pedagogy, digital age, Philosophy of education, Learning Technology.

### 1. Philosophy of education in the digital age

The digital age is different from any other age that preceded it in that it is based first and foremost on technology. Unlike previous periods in history technology played a major role in shaping, and this period is shaped by it.

The great upheavals known to humanity usually resulted from philosophical, political, and economic thought or from wars. The digital revolution attacks us in a completely different way, although it is mostly driven by economic considerations, it appeals to emotion and not to rationality.

Digital technology conquers and takes over every area of our lives without providing reasons why our lives will be better and how. Instead of rational persuasion, we turn to two other strong forces that influence our decisions and are related to each other - community and excitement.

The desire to belong to the community is an extremely powerful force. Humans are social animals and need contact with others to live a prosperous life. In the time we live in, the community is becoming more and more virtual, fragmented, and dependent on interests.

Technology allows us to maintain a community in the absence of a community. There is a paradox here – technology makes it possible to maintain contact between people, and creates a sense of community, but at the same time increases the actual disconnection between community members.

Digital technology also appeals to another strong driving force and that is excitement. Create around the technology a sense of the same aura that was lost with the transition to mass and duplicated technology. We are promised a different experience, we are promised that our lives will be better, that we will be more independent, more connected, aware, and important.

Not everything is negative of course, digital technology allows us to do things that were only a dream 30 years ago. It gives the individual and the community tools to create new knowledge, for learning and development. It makes it possible to maintain contact with distant people, to blur national borders, and to encourage civil democratic action.

The effects of technology on our lives are greater than we sometimes want to admit, so we must ask ourselves sharp questions about the nature of the time in which we live.

We must examine what kind of education is suitable for such a challenging period. In what way can technology be harnessed in education and how should education deal with its less desirable effects?

This is a big challenge that we are only at the beginning of. Education in the Western world has hardly changed since it was created, in the peak days of the industrial revolution. Today, we must adapt education to the changing world to truly improve our quality of life and quality of being.

## 2. Digital learning

### 2.1 *Characteristics of digital learning*

Digital learning is the latest pedagogic infrastructure in the 12th century, which includes teaching-learning methods integrated with information and communication technology in an online learning environment, and the implementation of appropriate modes of conduct in the online space for educational purposes.

This learning is based on the accessibility and use of units and digital teaching-learning materials, alongside online information sources, which are available to the teacher and the learners to build knowledge based on research, sharing, expansion, and deepening.

Its main characteristics are (Kleinberger, 1989):

- Personalization and flexibility – a central component of personal learning, which allows for personalization starting from the interface to the arrangement and management of personal information and access to it, up to the manner, duration, order, and content of the learning earning management – led and led by the teacher, with significant educational support for the learner, which enables personal autonomous learning and cooperative.
- Collaborative Ness and friendships – cooperative learning between the learners, which is founded by a common educational vision.
- Digital learning materials – use of high-quality digital learning materials, where the learning method is customized to the needs of each learner.
- Up-to-date and transparency – driven by up-to-date information by the needs of the teaching and the learner, transparency as well as sequence and continuity concerning the “big picture” of the learner’s knowledge and his world, cross-disciplinary topics, etc.’

## 2.2 Digital text

In every reference to learning in general and its application and realization through technology, the concept of text must be referred to, that we are the means of expression and transmission of ideas and information. A text is a mediator (medium) that transfers data and interpersonal messages from the authority of the many to the individual, and vice versa.

For example, verbal text, mathematical text, movement text, visual text such as a picture, video, cinema, theater, audio text such as music, recorded voice-overs, etc. The text is a means created by man, which is a series of agreed signs, through which information is transferred between one another.

A digital text is saved, displayed, and transmitted in computer systems, and creates an up-to-date meaning for the text, which is characterized by three main aspects: appears in a variety of media: written, visual, audio, and a combination of them enables access to information found in infinite layers, most of which are invisible and not in the user's possession, but accessible at any time and for any personal need at the appropriate time can be easily reproduced, changed, passed on to others, published, Process for personal needs and save it.

## 2.3 "Textbook" and "Digital Teaching-Learning Units"

Already today, the number of copies of books sold in digital format is equal to and even exceeds, the number of copies sold as a printed book, and the trend to switch to browsing, reading, and any activity with digital information is accelerating greatly.

Along with the trend of a personal computer device for everyone (laptop, tablet, phone), it seems that in a few more years, even in the education system, most of the accessibility to educational information will be through digital text and not the printed and written one.

A current approach to learning requires the implementation of digital learning, not as a luxury, but as a routine practice in which learning takes place and relies on information available in a digital text.

To adapt to today's current learning, digital learning, the definition of "textbook" in particular, and "learning materials" in general, must also be updated, for each type and format.

## 3. The importance of digital learning in education in the 21st century

Digital learning, which is learning through online and computerized means with digital text, first reflects the conduct of a modern teacher in a modern learning environment in a pedagogy appropriate to the 12<sup>th</sup> century.

There are more and more signs that as online learning environments take place in the classroom and among learners outside of it, the occasional learner has leveraged Learning through the integration of technology, better accessibility, improving learner involvement and motivation including achievements, and increasing learning efficiency.

Already today it is possible to see in practice, a positive central trend that is taking shape in everything related to the educational values added in digital learning, as reflected in large-scale studies of many hundreds of schools (such as the RED project detailed below).

We will see later, that the preoccupation with examining the efficiency, feasibility, and effectiveness of digital learning in general, and reading and perusal of digital text in particular, compared to traditional teaching, and the traditional book, serves us as essential feedback for

learning how to apply digital learning intelligently, and not whether to apply and to remain in learning in the traditional environment of a blackboard and a printed book (Cohen, 1983).

### 3.1 *Key advantages of digital learning*

#### (1) The effectiveness of learning

There are more and more signs, as online learning environments take a place in the classroom and among learners outside of it, that leveraging learning through the integration of technology brings better accessibility, improves learner involvement and motivation, including achievements, and increases the effectiveness of learning, such as:

- Recent studies presented by the American Department of Education, conducted on a large scale of schools and several learners, show that digital learning significantly reduces the time in which the learner achieves the learning goals. Already now there are clear indications of a better level of achievement of learners in digital learning, which includes personal and collaborative learning in online spaces outside of school class hours.
- According to the reports of the “RED” project (a national initiative in the USA among 999 schools and hundreds of thousands of learners), which investigates how technology creates a change in education (12 continuous access of each learner to a computer device connected to the Internet, causes a significant improvement in learning efficiency, including achievements studies, for economic advantages, especially in places where technology is intelligently integrated.

According to the report of the RED project – cooperative learning contributes to a significant improvement in educational achievements, including an increase in the number of graduates who successfully finished school. The significant advantage is emphasized, among other things, on the personal adaptation of the learning pace to the students, and the contribution of social learning to the degree of satisfaction, motivation, and active integration in learning. (Adar, 2007; Galily & Schwartz, 2021).

#### (2) The involvement of the learners

The students as “digital natives” have no difficulty integrating into digital learning, which educates them for learning while using the same technology they use for communication and spending their free time outside of school.

This figure does not state that the students should engage only in technology, but instead of a uniform reference usually to class, with them, learning modes of traditional teaching-learning, digital learning enables adjustment to the personal needs of each learner, and active learning in a much more enhanced way than in traditional learning. However, it must be remembered that the utilization of advantages and the enabling of technology.

Learning depends first all on the proper functioning of the teacher, on a significant backing of a clear vision of the educational leadership and its implementation in the field, full involvement of the director/leadership of the institution, and appropriate guidance and training of the educational staff.

#### (3) Increasing equal opportunities

Digital learning increases the equality of learning opportunities for all learners, by providing access to a wide variety of tools, resources, and educational content in any subject, regardless of the place of residence, and the socio-economic status, if the student has access to the Internet.

#### (4) Educational content

Digital content includes a rich variety of topics and information and enables interaction with materials, information sources, teachers, learning colleagues, and experts outside the classroom. Digital content can be easily updated by its owner, as well as edited and adapted to the context by a learner or teacher, and in a practical way almost infinite in quantity and variety, as a means of study in all areas of information and subjects studied.

#### (5) Cost

Replacing the textbooks, as well as tests, reports, sessions, etc., with digital content and means, includes long-term also real cost savings.

Such savings are not immediate, since the conversion and connection of digital learning materials require a large initial investment in planning, broadband communication infrastructures in educational institutions, the purchase of equipment and ongoing maintenance, software and tools, and teacher training.

Long-term thinking in the implementation of digital learning, aiming at the educational benefits for learners inherent in the use of digital materials, is incomparably more important than calculating cost versus benefit in the immediate term.

It seems that in the long term, the investment in learning materials for each learner will be significantly lower than what exists today, with significant advantages in aspects such as a significant increase in the time the teacher is present among the learners, reducing the cost of photographs and paper, online assessment at the appropriate time during learning, “hand on the pulse” on the pace of progress of every learner at any time, and as a result – reducing dropouts, especially in the higher age groups (Adar, 2007).

In addition to the above advantages (listed in the report Guide for Kindergarten-High School Educational Leadership to Gain Experience in Digital Learning, it is also possible to note:

- Strengthening the opportunities for professional development over time for teachers.
- Completing, diversifying, and deepening the learning activities (teaching-learning-evaluation) in response to the needs of the learner who is in the spirit of current digital learning.
- Refining and increasing the efficiency of learning management and control processes.
- A large variety of options for externalizing and publicizing the learner's knowledge, in media rich in visualization and audio.

### 3.2 *Digital reading*

The reference to a digital text still focuses to this day on the educational discourse, the efficiency, and the reading experience. This is a central but not the only aspect of the learner's learning experience in an interactive environment that is customized for the learner.

Reading and using a digital text, rather than the traditional printed text, is first reading. There is no difference between readable A page of a printed book, and the same page in a digital reader.

The fonts, the clarity, and the configuration are the same in both cases, and any attempt to look for differences and advantages/disadvantages in the understanding and effectiveness of reading between these two means of access is inappropriate and unnecessary.

According to the Israeli Ministry of Education's curriculum in reading, there are 3 levels of understanding of reading: understanding the overt audio that is interpreted in the text; revealing the implicit and hidden in the text; and A critical and appreciative personal attitude towards the text.

In addition, reading must be taught according to several central approaches:

- (1) Merging the reader's prior knowledge with what is found in the text for personal knowledge and insight that is unique to him.
- (2) A structured and gradual interpretation of what is found in the text, which will become the property of all readers.
- (3) Encouraging the mutual influence of the reader, on his world, his feelings, his understanding, and his emotions in the text - not only what do you learn from the text, but "what does it do to you?"

The emphasis on the characteristics of reading is an understanding of effective reading, which is not at all related to technology and formation, and not to dealing with the issue of whether there are advantages that affect the effectiveness of a personal computer device.

In any case, the importance of this issue is already marginal, since the use of digital learning materials, establishes reading and writing habits not with paper.

Hence, the intensive activity to convert learning to digital learning, which also includes turning existing texts into digital texts, does not stem from the starting point of realizing good reading and is much more efficient than existing education systems, but as a current, correct, and appropriate means for the technological era in the social and human aspect, appropriate for social learning.

Its distinct advantages listed above, include efficient accessibility and storage options that are much better than the book, the library, and the shelf. (The Israeli Ministry of Education, 2015).

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# A Model for Drug Discovery on Unstructured Text using Semi-Supervised Learning and Fuzzy Matching

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## *Abstract*

Health related discoveries are mainly published as journal publications and the rate at which they are generated increases as new information and discoveries emerge. Discovery of latent medically-related terms in a document corpus is a challenging task where the researcher is not an expert in that domain and a viable database of medicine related words is not readily available. The objective of the study was to investigate the methodologies and best practices that enable discovery of latent drug terms found in health publications corpus for effective dissemination at county and national levels. Fuzzy matching methodology was considered for its near and exact matching algorithms. DrugBank dataset was chosen as reference for drug terms because of its comprehensive list of drugs, that are frequently updated and freely accessible. Semi-supervised learning was applied in modeling of multi-search medical terms on an hourly basis. Drug-name recognition, sentence categorization and information retrieval are among the features described in the presented model.

**Keywords:** fuzzy matching, latent drug recognition, classification, information retrieval, dissemination.

## 1. Introduction

The Kenya National Cancer Control Strategy 2017-2022 [1] aims at ensuring an effective co-ordination of cancer research by developing and maintaining a repository of publications, while one of the proposed flagship programs under the Kenya Health Strategic and Investment plan 2013-2017 [2] is transitioning of research into policy and practical solutions at both the County and National levels. This research therefore, set out research objectives that were aimed at investigating methodologies and best practices for effective dissemination of the results obtained from publications through recognition of latent drug names.

Automatic discovery of latent medically-related terms in a document corpus is a challenging task. The challenges include but are not limited to; the fact that most publications are manually typed and therefore prone to typing errors and spelling mistakes. Secondly, the researcher analyzing the publications to generate latent medical terms from the document corpus are not expert in that domain. Thirdly, finding a viable medically-related database is arduous. Lastly, medical terms are commonly non-English dictionary words, that are written as a mixture of numbers, special characters like (hyphen (-), brackets ()) and non-English dictionary words.

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A review of existing research on health dissemination tools was also conducted where [3] utilizes fuzzy logic in automatic topic discovery while Gensim [4] algorithm is on use of Latent Semantic Indexing (LSI) and Latent Document Analysis (LDA). Tools developed for search and retrieval of Medline/PubMed database includes: Ovid medicine [5], PubMed [6], RefMed [7], Medline Ranker [8], MiSearch [9], Semantic Medline [10], MScanner [11], eTBLast [12], PubFocus [13], McSyBi [14], GoPubMed [15], PubNet [16], Babelmesh [17], HubMed [18], Semedico [19]. Google scholar [20] and Scopus [21] web crawler is applicable to various domain. Stanford [22] topic modeling toolbox summarizes text and tracks word usage while Mallet [23] is on document-topic hyper parameter optimization. VisTopic [24] and TopicNets [25] research area is on visual interactive analytics. GibbsLDA++ [26] utilizes LDA and Gibbs sampling in analysis of latent topic structures. Fathom [27] analyses calls for crisis counselling.

As an extension of the research study in [28] and the methodology presented in [31], this study analyzed and classified 3623 PubMed [29] health publications for drug-name Recognition, Sentence Categorization and Information Retrieval by utilizing [30], a fuzzy matching algorithm and semi-supervised learning in the study by [31]. Semi-supervised learning was for modeling multi-search medical terms on an hourly basis. A fuzzy sort ratio is set where a 95% and above match is considered for classification while 85-95% is expert reviewed as illustrated on the conceptual framework in Figure 1.

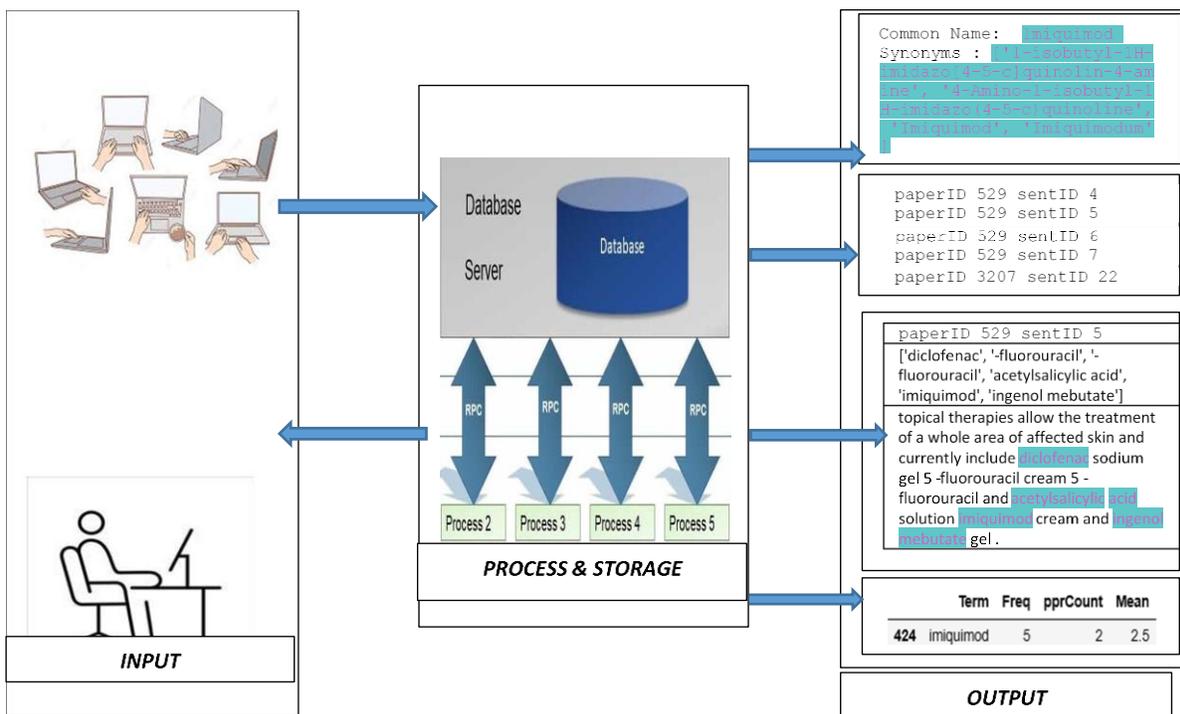


Figure 1: Conceptual Framework

The document corpus is automatically and sequentially analyzed, pre-processed and content fuzzy matched with DrugBank [32] datasets that was pre-downloaded and locally stored. Fuzzy matching was also applied to multi-searched terms. The output of the model includes: list of publications and sentences categorized by drug names; synonyms of drug name; aggregated frequency of drug names in a document and collection of documents; and number of documents containing similar drug names. DrugBank database was selected as reference for drug terms because of its comprehensive list of drugs, free accessibility and frequency of drug name updates in their databases.

## 2. Related works

The reviewed publications were on health dissemination tools, techniques and algorithms that are applicable to both short and full-text documents. The aim was to understand their application to topics discovery, classification and information retrieval.

Jain, Seeja and Jindal [33] applied Latent Semantic Analysis (LSA) and fuzzy similarity measure in their methodology, for concepts discovery and correlations identification. In topic modeling approach by Rashid, et.al [34] utilized fuzzy k-means latent semantic analysis (FKLSA) on medical and health text corpora. Multiple kernel fuzzy topic modeling technique by J. Rashid, et.al [35] was proposed for biomedical text mining. Fuzzy LSA-W and FLSA-V [36] was applied to topic embedding in text classification. In implementation of fuzzy keyword search over encrypted data in cloud computing [37] used edit distance to quantify keywords similarity. [3] presented fuzzy latent semantic analysis topic model as applied to health and medical corpora for automatic discovery of topics while Gensim [4] was developed for automatic extraction of semantic topics from documents. Google scholar [20] and Scopus [21] are applicable to multiple domain and its research areas includes algorithms on search optimization, information retrieval, ranking on documents.

In search, information retrieval and relevance ranking in health-related journals, Ovid Medline [5], PubMed [6], Medline ranker [8], MScanner [11], eTblast [12], PubFocus [13] and BabelMeSH [17] tools application is on Medline database while RefMed [7], MiSearch [9], Semantic Medline [10], McSyBi [14], GoPubMed [15], PubNet [16], HubMed [18], Semedico [19] application is on PubMed Journal.

## 3. Methodology

Data mining of content-wise information from publications is vital in document classification for a dissemination tool. This requires a priori data to inform the extraction. In this study the a priori data is from DrugBank datasets and used for purposes of fuzzy extraction of content-wise data from health publications and normalizing multi-search inputs.

The study applies the semi-supervised topic model [31] approach to update the most searched N words from the specified topics. User search terms must have a fuzzy threshold ratio of .95 with the DrugBank dataset and also must exist in the publications. Results to users are documents categorized by drug names and sentences with highlighted drug-names.

In reference to the conceptual framework in figure 1, the study methodology of the proposed health dissemination tool is in three parts; input process, document process and output process.

### 3.1 Input process

The system allows for multi search medical terms as inputs. These inputs are processed to remove joining characters like (+/\&#). Fuzzy matching algorithm for exact and near matches are applied to these inputs and matched with DrugBank datasets. A fuzzy match threshold of .95 is set where all inputs including their timestamps are analyzed. If they are above threshold they are automatically modeled using semi-supervised learning methodology discussed in [31], and this is done on an hourly basis. The terms below the threshold are separately stored for expert review.

The adapted method in [31] is utilized as follows: - The initial population N is the extracted medical terms from the document corpus. These terms are then ranked based of frequency of their occurrence in documents. The top searched terms on an hourly basis are introduced into the population and a fitness function applied. This fitness function is the average of the aggregated terms from document corpus divided by the number of documents containing the terms. The least fit in the population based on the fitness function is removed to maintain the initial population size of N. This is done on a continuous basis and in real-time as the search operation is performed.

### 3.2 Document process

Document processing is sequential and automatic and is applied to full-text publications. The document corpus is a collection of type *.pdf* health related publications. The documents are converted to text and pre-processing done. Fuzzy matching approach is the technique used to extract exact and near match drug names from the documents. For each document ID text is extracted and sentence tokenization is performed while assigning a sentence ID to each tokenized sentence. A fuzzy threshold of .95 is set for extracting drug-names from the sentences. If the extracted term is below the threshold, it is saved separately for expert review. This is process is done automatically and sequentially for all documents processed in the repository.

### 3.3 Output process

The output of the extracted drugs is a statistical analysis of drug frequencies contained in a document, aggregated frequency of these drugs from the document corpus and the number of documents containing these drugs. This is irrespective of it being a common drug name or its synonym. Output from search inputs returns the common name of the drug searched and its synonyms. Thereafter, it returns the paperID, SentenceID and sentences where the common name or search name is found.

This also returns other drug names found in the document and their common name and synonyms. Drugs found in the sentences extracted are also highlighted

## 4. Results

In the study, 6.58GB of health publications from the PubMed Central database was downloaded, this was equivalent to 3,623 files from 177 Folders. Figure 2 shows the highest frequency of drug related words from the document corpus.

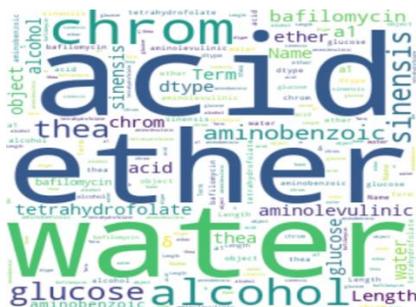


Figure 2. WordCloud

Table 1 in Appendix shows the results from processing the multi-search inputs. The *drug searched* column is a representation of how each drug name that has been fuzzy matched is individually analyzed to give its *common name* and *synonyms* before extracting documents and sentences that contain either of these drug names. Further, analysis of other drugs found in the sentence is done to extract them and thereafter the sentence column shows the highlighted drug names.

## 5. Conclusion

Dissemination of information from publications is crucial for quick decision making by policy makers. Health related discoveries are mainly published as journal publications and the rate increases as new information and discoveries emerge. It is therefore important for health researchers to have tools and algorithms that allows fast information retrieval and categorization of related information. For precision retrieval it's crucial that these techniques are domain specific and application is located where the corpus is stored for sequential analysis of the continuously updated publications. Monitoring frequency of searched terms acts as a guide to policy makers on trends.

A prototype for automatic discovery of latent drug terms from corpus was developed. This effectively deviates from the norm of disseminating full-text publications that are tedious to manually analyze for specific content. The summary obtained as a classification of publication and sentences that only have the searched results *common* drug name or its *synonyms* allows for quick evaluation of content importance. Challenge is that some English dictionary words have fuzzy sort ratio score that are same or near same as the drug names which requires another layer to distinguish them. This process requires a dedicated expert reviewer to distinguish the drug names from English dictionary words.

As a developing country effective dissemination of health data in summarized format allows for rapid research growth and fast decision making by policy makers at both county and national levels. Future works proposes to implement the solution on a health repository in Kenya in line with [1,2] and the Kenya National Cancer Control Strategy and Kenya Health Sector Strategic and Investment Plan.

## Author contribution

All authors played key roles in successful completion of this research study. 1 and 2 conceived the initial ideas and design. 1 and 3 formulated the theory and justification of the methodology. 1 performed the computations, verified the analytical methods and interpreted the data. 2 and 3 encouraged, supervised and provided positive critic on findings of this study. All authors discussed the results and contributed to the final manuscript.

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The authors declare no competing interests.

### Data Availability

The data that supports the findings of this study are available upon request to the Corresponding Author at <https://github.com/cmulunda/LatentDrugRecognition>

DrugBank datasets restrictions apply to the availability of these data and were used under Academic Research Agreement. The data is available from [32] at <https://go.drugbank.com/>.

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Appendix:

Table I: Shows the transformation of results from the inputted multi-search medical terms to output

Manually Typed Search Terms	Inputs: acetylsalicylic acid+Ticagrelor+imiquimod			
Processed Inputs	Processed Inputs: ['acetylsalicylic acid', 'ticagrelor', 'imiquimod']			
Drug Searched	CommonName and Synonym	List of papers and Sentences containing either CommonName or Synonym	Other Drugs found in the extracted Sentences	Sentence Extracted
acetylsalicylic acid	Common Name: Acetylsalicylic acid Synonyms : 2-Acetoxybenzoic acid, 2-Acetoxybenzoic acid, Acetylsalicylate, Acetylsalicylure, acide 2-acétoxybenzoïque, Acide 2-acétoxybenzoïque, Acide Acetylsalicylique, acetylalicylate, Acidum acetylsalicylicum, ASA, Aspirin, Aspirine, Acetylsalicylure, acetoxybenzoic acid, O-acetylsalicylic acid, o-carboxyphenyl acetate, Polopiryna, salicylic acid acetate	paperID 48 sentID 19	['aspirin', 'clopidogrel', 'atorvastatin', 'rosuvastatin', 'rosuvastatin', 'aspirin', 'clopidogrel']	patients will take aspirin, clopidogrel and high-intensity statins ( atorvastatin or rosuvastatin ) within 24 hours of stroke onset followed by aspirin or clopidogrel alone from day 22 .
		paperID 529 sentID 5	['diclofenac', '-fluorouracil', '-fluorouracil', 'acetylsalicylic acid', 'imiquimod', 'ingenol mebutate']	topical therapies allow the treatment of a whole area of affected skin and currently include diclofenac sodium gel 5 - fluorouracil cream 5 -fluorouracil and acetylsalicylic acid solution imiquimod cream and ingenol mebutate gel .
		paperID 745 sentID 36	['alcohol', 'aspirin']	( 12 ) the clinical backgrounds and comor- bidities such as age sex smoking alcohol consumption anthra- noid use aspirin use diabetes mellitus inflammatory bowel disease parkinson's disease and hypothyroidism related to colorectal neoplasms or mc were investigated using electronic medical records .
		paperID 1002 sentID 10	['acetylsalicylic acid', 'ticagrelor']	after anterior myocardial infarction was diagnosed 300 mg acetylsalicylic acid and 180 mg ticagrelor loading doses were given .
		paperID 1002 sentID 28	['acetylsalicylic acid', 'acetylsalicylic acid']	loading doses of 300 mg acetylsalicylic acid and 180 mg ticagrelor were given .
		paperID 1088 sentID 3	['naproxen', 'aspirin', 'ketoprofen']	this study was aimed at conducting a network meta-analysis to assess the efficacy and safety of 5 otcas – naproxen ibuprofendiclofenac aspirin and naproxen – in patients with primary dysmenorrhea .
		paperID 1088 sentID 8	['aspirin', 'naproxen', 'ibuprofen', 'diclofenac', 'ketoprofen']	as for efficacy outcomes all the included analgesics except aspirin were more effective than placebo in treating dysmenorrhea [naproxen ( or 3 . 99 95 % ci 2 . 18 –7 . 30 ) ibuprofen ( or 10 . 08 95 % ci 3 . 29 –30 . 85 ) diclofenac ( or 11 . 82 95 % ci 2 . 66 –52 . 48 ) and ketoprofen ( or 5 . 12 95 % ci 1 . 57 –16 . 69 ) .
		paperID 1088 sentID 10	['aspirin', 'ibuprofen', 'diclofenac']	aspirin was less effective than ibuprofen ( or 0 . 17 95 % ci 0 . 04 –0 . 73 ) and diclofenac ( or 1 . 17 95 % ci 0 . 02 –0 . 85 ) .
		paperID 1088 sentID 11	['diclofenac', 'ibuprofen', 'ketoprofen', 'naproxen', 'aspirin']	the sucra curves showed that diclofenac and ibuprofen were the most and second most effective ( 85 . 1 % and 83 . 8 % respectively ) followed by ketoprofen naproxen and aspirin .
		paperID 1088 sentID 13	['diclofenac', 'ibuprofen', 'ketoprofen', 'diclofenac', 'ketoprofen', 'aspirin']	diclofenac versus ibuprofen ( or 4 . 31 95 % ci 1 . 18 – 15 . 67 ) ketoprofen versus diclofenac ( or 0 . 18 95 % ci 0 . 04 –0 . 78 ) and ketoprofen versus aspirin ( or 0 . 41 95 % ci 0 . 18 –0 . 97 ) presented statistically significant differences .
		paperID 1088 sentID 14	['ketoprofen', 'ibuprofen', 'naproxen', 'aspirin', 'diclofenac']	ketoprofen and ibuprofen were ranked the best ( sucra 90 . 6 % and 79 . 6 % ) followed by naproxen aspirin and diclofenac .
		paperID 1217 sentID 14	['heparins', 'bivalirudin', 'aspirin']	guidelines recommend the use of adjunctive therapies during ppci including anticoagulants ( heparins and bivalirudin ) and antiplatelet activation drugs ( aspirin and p2 y12 inhibitors ) .
		paperID 1319 sentID 2	['acide acétylsalicylique', 'apixaban']	2 les antithrombotiques ne sont pas recommandés pour la thromboprophylaxie chez les patients atteints de covid-19 légère non hospitalisés dans un essai randomisé et contrôlé cessé prématurément en raison de taux d'événements moindres que prévu ni l'acide acétylsalicylique ( aas ) ni l'apixaban ( à des doses prophylactiques ou thérapeutiques ) n'ont réduit les taux d'événements cardiovasculaires ou pulmonaires majeurs comparativement au placebo chez des patients atteints de covid-19 légère non hospitalisés23 .
paperID 1319 sentID 6	['acide acétylsalicylique']	5 l'acide acétylsalicylique n'améliore pas l'issue chez les patients hospitalisés non sélectionnés l'aas n'est pas recommandé pour prévenir la mortalité ou le recours au soutien des fonctions vitales chez les patients hospitalisés pour la covid-19 non sélectionnés36 .		

Manually Typed Search Terms	Inputs: acetylsalicylic acid+Ticagrelor+imiquimod			
Processed Inputs	Processed Inputs: ['acetylsalicylic acid', 'ticagrelor', 'imiquimod']			
Drug Searched	CommonName and Synonym	List of papers and Sentences containing either CommonName or Synonym	Other Drugs found in the extracted Sentences	Sentence Extracted
		paperID 1352 sentID 1	['nattokinase', 'nattokinase', 'aspirin']	221 lab anim res 2013 : 29 ( 4 ) 221 -225 <a href="http://dx.doi.org/10.5625/lar.2013.29.4.221">http://dx . doi . org/10 . 5625 /lar . 2013 . 29 . 4 . 221</a> <a href="#">nattokinase</a> improves blood flow by inhibiting platelet aggregation and thrombus formation ja-young jang1 # tae-su kim2 # jingmei cai1 jihyun kim1 youngeun kim1 kyungha shin1 kwang sei kim1 sung kyeong park3 sung-pyo lee2 ehn-kyoung choi1 man hee rhee4 * yun-bae kim1 * 1 college of veterinary medicine chungbuk national university cheongju korea 2 misuba rtech co . ltd . asan korea 3 daejeon health sciences college daejeon korea 4 college of veterinary medicine kyungpook national university daegu korea the effects of <a href="#">nattokinase</a> on the in vitro platelet aggregation and in vivo thrombosis were investigated in comparison with <a href="#">aspirin</a> .
		paperID 1352 sentID 8	['nattokinase', 'aspirin']	in addition a high dose ( 500 mg/kg ) of <a href="#">nattokinase</a> fully prevented the occlusion as achieved with <a href="#">aspirin</a> ( 30 mg/kg ) .
		paperID 1615 sentID 8	['aspirin']	<a href="#">aspirin</a> may also be effective for patients with ischemic stroke who have contraindications to anticoagulants although direct comparisons with anticoagulants are not available .
		paperID 1764 sentID 15	['aspirin']	in 1971 vane[5 ] demonstrated that <a href="#">aspirin</a> ndomethacin and other non-steroid anti-inflammatory drugs inhibited the synthesis of prostaglandins and he postulated that these drugs owed their anti-inflammatory anti-pyretic analgesic actions to their ability to inhibit pg biosynthesis .
		paperID 2435 sentID 9	['aspirin']	interventions: the patient was administered g-globulin 1 . 0 g/kg·d for 2 consecutive days and oral <a href="#">aspirin</a> 5 mg/kg·d .
		paperID 2435 sentID 11	['aspirin']	the dose of <a href="#">aspirin</a> was reduced to 3 mg/kg·d after 2 months and to 1 . 5 mg/kg·d after 3 months .
		paperID 2703 sentID 13	['aspirin']	to prevent thrombus formation or attempt to resolve an existing thrombus low molecular weight <a href="#">aspirin</a> ( schwarzwald et al . 2002 ; feige et al . 2003 ) <a href="#">acetylsalicylic acid</a> ( schoster 2017 ) and <a href="#">acetylsalicylic acid</a> <a href="#">aspirin</a> <a href="#">pharmacogenetics</a> ( bäumer et al . 2013 ) have been proposed as systemic treatments .
		paperID 2791 sentID 15	['aspirin']	she received dual antiplatelet therapy for 1 year followed by lifelong <a href="#">aspirin</a> in addition to high-intensity statin and a beta-blocker .
		paperID 2799 sentID 26	['aspirin']	similar effect modification was observed for <a href="#">aspirin</a> ( or 1 . 90 ; 95 %ci 0 . 77 to 4 . 70 for non-users and or 1 . 02 ; 95 %ci 0 . 34 to 3 . 08 for users ) and $\beta$ -blockers . 2 these findings raise questions about the role of coronary circulation in cold-related pathogenesis of scd .
		paperID 2939 sentID 17	['aspirin', 'cilostazol', 'prednisolone']	since the pci she has been taking <a href="#">aspirin</a> 100 mg; clopidogrel 75 mg and <a href="#">cilostazol</a> 100 mg for coronary artery disease treatment and <a href="#">prednisolone</a> 5 mg and hydroxyquinolone for lupus treatment .
		paperID 2989 sentID 15	['aspirin']	• <a href="#">aspirin</a> is not recommended for patients with congestive heart failure ( chf ) .
		paperID 3036 sentID 23	['aspirin', 'atenolol', 'furosemide', 'furosemide', 'budesonide', 'albuterol', 'umeclidinium', 'umeclidinium']	his outpatient medication includes <a href="#">aspirin</a> <a href="#">atenolol</a> <a href="#">furosemide</a> <a href="#">budesonide</a> nebuliser <a href="#">albuterol</a> and <a href="#">umeclidinium</a> inhaler .
		paperID 3241 sentID 5	['aspirin']	we correlate the influence of chronic statin therapy ( at least 6 months ) with factors including age up to 50 years helicobacter pylori infection smoking and drinking habits ulcer history gastrotoxic drug consumption ( low-dose <a href="#">aspirin</a> [asa] anticoagulants ) and comorbidities .
		paperID 3241 sentID 12	['aspirin', 'nitric oxide', 'pge2', 'pgi2', 'pgi2']	abbreviations: <a href="#">asa</a> = low-dose <a href="#">aspirin</a> ci = confidence interval hf = heart failure <a href="#">nsaids</a> = non-steroidal anti-inflammatory drugs ors = odds ratio <a href="#">pge2</a> = <a href="#">prostaglandin g2</a> <a href="#">pgi2</a> = <a href="#">prostaglandin i2</a> ppi = proton pump inhibitors sat = systemic atherosclerosis .
		paperID 3241 sentID 13	['aspirin']	keywords: comorbidities endoscopic lesions helicobacter pylori low-dose <a href="#">aspirin</a> statin 1 .
		paperID 3382 sentID 16	['cascades', 'arachidonic acid', 'adenosine diphosphate']	generally <a href="#">platelet</a> activation is triggered by several intracellular signaling cascades stimulated by different adhesive proteins and abbreviations: aa <a href="#">arachidonic acid</a> ; adp <a href="#">adenosine diphosphate</a> ; ac adenylyl cyclase; <a href="#">caspase</a> <a href="#">caspase</a> <a href="#">caspase</a>

Manually Typed Search Terms	Inputs: acetylsalicylic acid+Ticagrelor+imiquimod			
Processed Inputs	Processed Inputs: ['acetylsalicylic acid', 'ticagrelor', 'imiquimod']			
Drug Searched	CommonName and Synonym	List of papers and Sentences containing either CommonName or Synonym	Other Drugs found in the extracted Sentences	Sentence Extracted
			'adenosine', 'adenosine', 'camp', 'cyclic adenosine monophosphate', 'adenosine monophosphate', 'adenosine', 'adenosine', 'acetylsalicylic acid', 'adenosine triphosphate', 'adenosine', 'adenosine', 'calcium', 'inositol-', 'platelet-activating factor', 'prothrombin', 'tyrosine']	monophosphate; <b>acetylsalicylic acid</b> ; <b>adenosine</b> triphosphate; akt protein kinase b; [ca2 $\beta$ ]i intracellular <b>adenosine</b> ion; cox cyclooxygenase; crp collagen-related peptide; csf crude saponin fraction; erk extracellular signaleregulated kinase; gpvi glycoprotein vi; ic50 half maximal ( 50 % ) inhibitory concentration; ip3 inositol-145 -triphosphate; jnk c-jun n-terminal kinase; mapk mitogen-activated protein kinase; mkk4 mitogen-activated protein kinase 4 ; mlc myosin light chain; <b>platelet-activating factor</b> ; par proteinase-activated receptor; pi3 k phosphatidylinositol 3 -kinase; pka protein kinase a; pkc protein kinase c; pkg protein kinase g; cpla2 a cytosolic phospholipase a2 a; pla2 phospholipase a2 ; plcg2 phospholipase c gamma-2 ; apt activated partial thromboplastin time; pt <b>prothrombin</b> time; ppp protopanaxadiol; ppt protopanaxatriol; rock rho-associated protein kinase; skf src family kinase; syk spleen <b>tyrosine</b> kinase; ts total saponin; txa2 thromboxane a2 ; txb2 thromboxane b2 ; txas thromboxane-a synthase; txr thromboxane receptor; vasp vasodilator-stimulated phosphoprotein; vwf von willebrand <b>factor</b> .
		paperID 3407 sentID 23	['aspirin']	during workup patient complained of transient right sided face and arm tingling diagnosed with tia and started on <b>aspirin</b> .
		paperID 3423 sentID 13	['vonoprazan', 'simvastatin', 'simvastatin', 'cholesterol', 'simvastatin', 'simvastatin', 'simvastatin', 'verapamil', 'apatinib', 'vonoprazan', 'potassium', 'aspirin']	aphy-tandem mass spectrometry rat liver microsomes introduction as one of the drugs <b>simvastatin</b> wide clinical application <b>simvastatin</b> is mainly used to treat dyslipidemia and it can reduce the concentrations of total <b>cholesterol</b> triglyceride and low-density lipoprotein ( ldl ) in plasma accomplished by increasing the concentration of high-density lipoprotein ( hdl ) . 1 it has been reported that <b>simvastatin</b> is the substrates for cytochrome p450 ( cyp ) enzymes p-glycoprotein ( p-gp ) and organic anion-transporting polypeptide transporter ( oatp1 b1 ) and it is mainly metabolized via cyp3 a4 /5 <b>simvastatin</b> cyp2 c8 /9 /19 and cyp2 d6 also involved in partial metabolism . 2 recently drug- drug interactions between <b>simvastatin</b> and other drugs were reported such as <b>simvastatin</b> could inhibit the metabolism of <b>verapamil</b> and <b>apatinib</b> and increase their bioavailability by inhibiting cyp3 a and p-glycoprotein ( p-gp ) efflux pumps . 34 <b>simvastatin</b> a potassium-competitive <b>simvastatin</b> blocker ( p-cab ) is a novel reversible proton pump inhibitor ( ppi ) that is used for the treatment or the prevention of gastric acid-related clinical conditions such as erosive esophagitis gastroesophageal reflux gastroduodenal ulcer <b>simvastatin</b> or nsaid-induced peptic ulcer and it can also be used for the eradication of helicobacter drug design development and therapy 2022 :16 1779 –1789 1779 © 2022 hong et al .
		paperID 3491 sentID 13	['warfarin', 'aspirin', 'warfarin']	two patients changed their treatment from <b>warfarin</b> to aspirin; others remained on <b>warfarin</b> .
		paperID 3503 sentID 13	['aspirin', 'clopidogrel', 'metoprolol']	she was started on <b>aspirin</b> , <b>clopidogrel</b> and <b>metoprolol</b> .
ticagrelor	Common Name: <b>Ticagrelor</b> Synonyms : <b>[(1S,2S,3R,5S)-2-(7-[(1R,2S)-2-(3-4-Difluorophenyl)butyl]propylamino)-3-(3-oxo-1-phenylpropan-2-yl)propanoate-3-yl]-5-(2-hydroxyethoxy)acetyl pentane-1,2-diol</b> <b>Ticagrelor</b>	paperID 1002 sentID 1	['ticagrelor']	60 case reports diffuse alveolar hemorrhage associated with <b>ticagrelor</b> therapy after percutaneous coronary intervention samet yılmaz oğuz kılıç yalın tolga yaylalı department of cardiology pamukkale university hospitals; denizli-turkey introduction after acute coronary syndrome ( acs ) various antiplatelet agents are used to prevent stent thrombosis death and recurrent myocardial infarction .
		paperID 1002 sentID 2	['clopidogrel', 'prasugrel', 'ticagrelor']	the currently available antiplatelet agents are <b>clopidogrel</b> , <b>prasugrel</b> and <b>ticagrelor</b> .
		paperID 1002 sentID 3	['ticagrelor']	the european society of cardiology guidelines recommend <b>ticagrelor</b> as a first choice antiplatelet regimen after acs ( 1 ) .
		paperID 1002 sentID 6	['ticagrelor', 'ticagrelor']	although dyspnea is frequently reported in patients receiving <b>ticagrelor</b> dah due to <b>ticagrelor</b> use is very rare in the literature ( 2 3 ) .
		paperID 1002 sentID 7	['ticagrelor']	thus we present two cases of antiplatelet-related dah occurring after <b>ticagrelor</b> therapy .
		paperID 1002 sentID 10	['acetylsalicylic acid', 'ticagrelor']	after anterior myocardial infarction was diagnosed 300 mg <b>acetylsalicylic acid</b> and 180 mg <b>ticagrelor</b> loading doses were given .
		paperID 1002 sentID 20	['ticagrelor']	based on radiological findings dah due to <b>ticagrelor</b> emerged as the most obvious reason for hemoptysis .

Manually Typed Search Terms	Inputs: acetylsalicylic acid+Ticagrelor+imiquimod			
Processed Inputs	Processed Inputs: ['acetylsalicylic acid', 'ticagrelor', 'imiquimod']			
Drug Searched	CommonName and Synonym	List of papers and Sentences containing either CommonName or Synonym	Other Drugs found in the extracted Sentences	Sentence Extracted
		paperID 1002 sentID 21	['ticagrelor', 'oxygen']	ticagrelor was stopped and continuous oxygen inhalation was started at 2 l/min .
		paperID 1002 sentID 24	['clopidogrel', 'ticagrelor']	clopidogrel instead of ticagrelor was started as the second antiaggregant therapy and the patient was discharged from the hospital on the 7 th day .
		paperID 1768 sentID 24	['ticagrelor', 'clopidogrel']	ticagrelor was used in 27 patients and clopidogrel in 3 as the dual antiplatelet .
imiquimod	Common Name: imiquimod Synonyms : [1-isobutyl-1H-imidazol-4-yl]quinoline-4-amine 4-Amino-1-isobutyl-1H-imidazol-4-yl-quinoline imiquimod imiquimodum	paperID 529 sentID 4	['diclofenac', 'ingenol mebutate', 'imiquimod']	with an approach focused on the photo-damaged skin instead of single lesions topical therapies have the advantage over surgical or ablative therapies of treating subclinical lesions as well with recent evidence showing the latter also have the ability to degenerate into scc . 2 cost-efficacy analysis of 3 % diclofenac sodium ingenol mebutate and 3 . 75 % imiquimod in the treatment of actinic keratosis steven nisticò1 ester del duca1 valeria torchia2 micaela gliozzi2 ugo bottoni1 and carolina muscoli3 abstract actinic keratosis ( ak ) is a clinical condition characterized by keratinocytic dysplastic lesions of the epidermis affecting individuals chronically exposed to sunlight .
		paperID 529 sentID 5	['diclofenac', '-fluorouracil', '-fluorouracil', 'acetylsalicylic acid', 'imiquimod', 'ingenol mebutate']	topical therapies allow the treatment of a whole area of affected skin and currently include diclofenac sodium gel 5 - fluorouracil cream 5 -fluorouracil and acetylsalicylic acid solution imiquimod cream and ingenol mebutate gel .
		paperID 529 sentID 6	['diclofenac', 'ingenol mebutate', 'imiquimod']	due to the comparable efficacy of 3 % diclofenac ingenol mebutate and 3 . 75 % imiquimod in treating ak multiple lesions a pharmacoeconomic evaluation of cost-effectiveness of the three treatments was needed .
		paperID 529 sentID 7	['diclofenac', 'ingenol mebutate', 'imiquimod']	a cost-efficacy analysis comparing 3 % diclofenac sodium with ingenol mebutate and 3 . 75 % imiquimod was performed .
		paperID 3207 sentID 22	['fluorouracil', 'imiquimod', 'ingenol mebutate', 'diclofenac']	with multiple lesions the second-line therapy is the use of topical treatments including fluorouracil imiquimod ingenol mebutate and diclofenac [5] .

### AIMS AND SCOPE

The OJIT, as an international multi-disciplinary peer-reviewed **online open access academic journal**, publishes academic articles deal with different problems and topics in various areas of information technology and close scientific disciplines (information society, information communication technology - ICT, information architecture, knowledge organisation and management, information seeking, information management, electronic data processing – hardware and software, philosophy of information, communication theory and studies, mass communication, information ethics, library and information science, archival science, intellectual property, history of computer technology, development of digital competencies, ICT in education and learning, ICT education, etc.).

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