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Methods of Research

Arabic as the Language of Instruction in The Departments of Natural Sciences at Arab Universities

Abstract

Most Arab universities teach in English at the departments of natural sciences. As a result, the student's performance deteriorated as it is not delivering the expected outcomes. The hypothesis is that the education at natural sciences departments in English is not delivering the expected outcomes and not preparing Arab students to carry out a revival of their countries. An empirical research was conducted to study the negative consequences of teaching in English at Philadelphia University at the Colleges of Sciences, Nursing, Engineering and Pharmacy. The Vice-President, the deans, instructors and department chairs were interviewed, and a questionnaire was distributed among students. The results were in favor of teaching in Arabic. The Vice-President, Deans and Department Chairs discussed possible means of teaching in Arabic, and some discussed how they have been incorporating Arabic in their classes and departments. Most students said they exert extra effort to study English textbooks and that studying in Arabic would improve their performance. The paper concludes that the Arab countries need to take immediate steps to Arabize instruction of the natural sciences at Arab universities.

The overwhelming surge of globalization has invaded communities all around the world, as citizens stand bewildered and taken aback, welcoming, resisting or forced to go with its influx. English, the main tool of globalization and the global lingua franca, is now a prevalent medium of instruction in the prestigious international academic institutions. Feeling obliged to understand the first-world powerful countries, which are exporting their cultural and material products, Arab universities adopted English as the medium of instruction. This created the dilemma of "Taghreeb" as opposed to "Ta'reeb", as Dr. Ghaseeb (2018) puts it in Arabic, which is westernization vs. Arabization. In order for Arab universities to achieve academic excellence and compete with the most prestigious

academic institutes, they need to adopt Arabic as the language of instruction; the mother tongue and the symbol of national identity.

In The International Day of the Arabic Language, Prof. Ghaseeb (2017) a member at the Jordan Academy of Arabic gave a lecture in the Academy under the title: *Terminology and Arabization*. Ghaseeb discussed the efforts exerted at the academy in Arabization, which include; translation of university textbooks; Arabization of scientific symbols, and Arabization of Terms (Ghaseeb 2017). (See Appendix 1, images 1, 2 and 3 for several samples of dictionaries of Arabized and translated scientific terms).

He indicates that Arabic would cultivate the creative mindset and unite Arab communities (Ghaseeb 2017). Bjourn and Garrison (1975) share this view. They define an *Arab* as one who speaks Arabic and refers to himself as an *Arab*. They say that in spite of the variation in the Arabic language between previously colonized Arab countries, the "*strength for the unity of all Arabs lies in the emotions it arouses and in the belief that there is some kind of organic unity between Arabism and the Arabic language*."

Several papers have addressed Arabization of university education with different perspectives. Arab Maghreb countries had an unfruitful Arabization of university education at, as communities refused Arabization policies according to Baoueb and Toumi (2012). They studied the Modernization of Arabic in Tunisia, to be used as an efficient tool of communication in all modern domains, which resulted in code-switching practices between Arabic and French. In a similar situation, Boum (2008) believes that Arabization failed in Morocco due to the social belief that Arabic is a language of religion and humanities rather than sciences. This gives privilege to members of the upper and middle classes who are fluent in French and study scientific subjects, whereas students from rural areas who studied in Arabic pursue a degree in religion and humanities.

A different and positive perspective toward Arabization is reflected in papers which depict the Qatari, Egyptian and Syrian university education. Teaching medicine in Arabic at Egyptian universities enables students to think, understand and learn in Arabic, which would enhance the quality of learning and improve performance, based on a questionnaire conducted by Sabbour et al. (2008). A similar attitude is found in Elli-li-Cherif & Alkhatib's, (2015) paper, where the Qatari Universities' Arabization decision received support from students and their families. The Syrian Arabization policy is depicted by Badinjki (1994). It started with establishing the College of Medicine, after similar efforts in Egypt and Lebanon. This set an example for the resourceful and adapting nature of Arabic. A magazine was launched, and textbooks and dictionaries were published in Arabic, with coined and translated scientific terms, after which they were adopted at university departments of medicine, pharmacology and engineering. The empirical paper of Al-Asal & Smadi (2011) reflects the outcomes of Arabization efforts in Syria as students of medicine and engineering at the University of Damascus showed higher proficiency in the

Arabic term as opposed to its Arabized equivalent compared to students at Jordan University of Science and Technology, which is a proof that Arabic is capable of treating scientific concepts adequately.

Modernization of Arabic requires standardization processes through political and administrative activities, as Faiza (2013) argues. She remarks that language planners need to portray Arabic to the community as a tool which facilitates their life and as a language of high value, whose absence and disrespect harms the community. Moreover, she believes awards shall be dedicated for successful initiatives in the Arabic language. Furthermore, she says the government shall issue decrees and arrange media campaigns and activities to promote standard Arabic, and put Arabic skills as an employment requirement for jobs in administration.

This paper explores prospects and challenges of Arabization of education at Jordanian universities. For this purpose, a questionnaire was distributed among students of the departments of Engineering, Nursing, Pharmacy and Sciences in the University of Philadelphia. They were asked questions regarding their proficiency in Arabic and their overall academic performance. The chairs of the aforementioned departments and instructors were asked to express their views on teaching in Arabic and whether they incorporate Arabic terms in class. The deans of the four departments were also asked on means of promoting Arabic as a language of instruction. Conclusions were formalized by amalgamating the interviews with the deans, department chairs, and instructors with the survey results. Finally, solutions and recommendations were provided.

Method

As an empirical method, I have conducted interviews with the deans and instructors at the departments of Engineering, Pharmacy, Natural Sciences and Nursing at Philadelphia University. As for students, I distributed a questionnaire among them.

The sample consists of the Vice-President of Philadelphia University, Deans of the four departments, sixteen department chairs and instructors and fifty-five male and female students. Five students from each faculty of Nursing, Pharmacy and Sciences filled a questionnaire, with forty students from the faculty of engineering, which includes eight engineering departments, five students from each department. The age of students is between nineteen and twenty-two years.

Results

The Vice-President, the deans of Engineering, Sciences, Pharmacy and Nursing presented their opinions on the possibility having Arabic as the language of instruction at Philadelphia University. They acclaimed attempts to Arabize education in Syria, Iraq, and Algeria. They also suggested learning lessons from the French, German, Spanish and Chinese educational systems where the first language is the language of instruction at universities. Interestingly, some of the deans have written books in Arabic and translated many others into Arabic.

The Vice-President and Faculty Deans

The Vice-President said that even though Arabic is capable of delivering scientific terms, the fact that all academic papers and books are written in English compels universities to teach in English.

The dean of Pharmacy, who is also the Dean of Scientific Research in Philadelphia University believes teaching in Arabic will improve the quality of teaching and comprehension. He believes that having initiative, a clear vision and collaborating to modernize Arabic will make it possible to teach natural sciences in Arabic.

Furthermore, the Dean of Sciences College and the Dean of Nursing College, say that Arabic is capable of serving the scientific academic domains. They add that as long as there are no projects to translate science books, Arabic may not be a language of instruction at the Colleges of Sciences and Nursing. Based on relevant experiences in managing translation projects and managing university departments, the Dean of Engineering College remarks that Arabization in Iraq, Jordan, and Syria faced many hurdles. First, some instructors were graduates of international institutes and received their education in a second language. Second, there was shortage of translated books, scientific references and databases of common Arabized terms. He praises the Spanish institutions which carry out a monthly translation of the latest English articles and books. In order for them to have a scientific renaissance, Arab academic institutions, he argues, need to take immediate and serious steps to Arabize the syllabi of natural sciences. See Appendix 2, image 1: Interviews with the Vice-President and the Deans

Instructors and Department Chairs

When asked about their opinions about teaching in Arabic, 70.97% of the instructors and department chairs expressed their opposition, while 29.03% said they support such a decision. Figure 1 below shows analysis of their responses. See Appendix 2, image 2: Interviews with the Vice-President and the Deans.

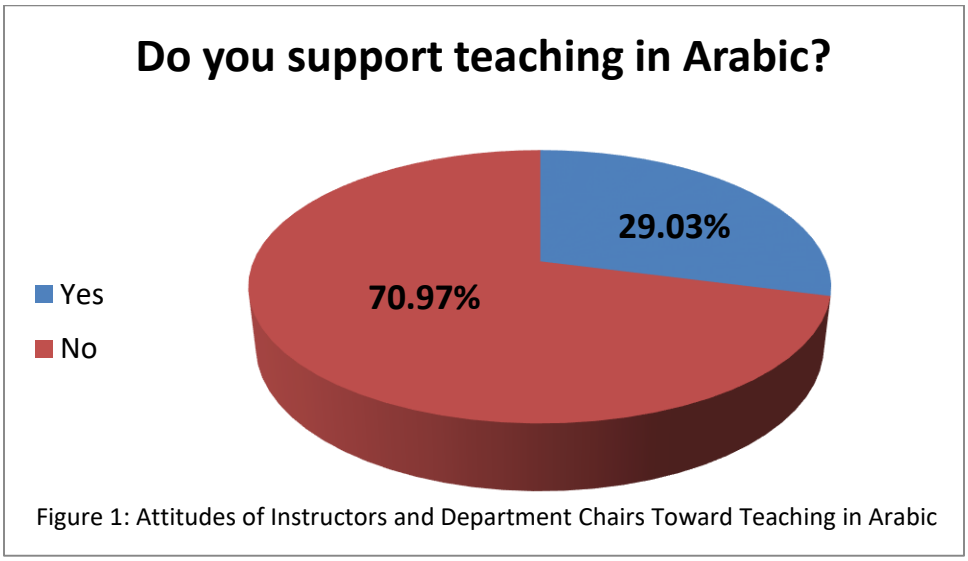

Figure 1: Attitudes of Instructors and Department Chairs Toward Teaching in Arabic

Among those who believed Arabic can not be a language of instruction of Science departments, around 4 % said they think Arabic is incapable of conveying scientific concepts, whereas 90% stated that Arabic is not a global language and 6% said they believe Arabic is incapable of conveying scientific concepts because it is not a global language.

One of the main reasons for the instructors' preference for Arabic as a language of instruction was due to students' weakness in English. Around 40% of instructors said they make use of Arabic technical and general terms in class.

Students

With regard to students, 60.87% said they do not support studying in Arabic, and 39.13% said they do, as figure 2 below shows.

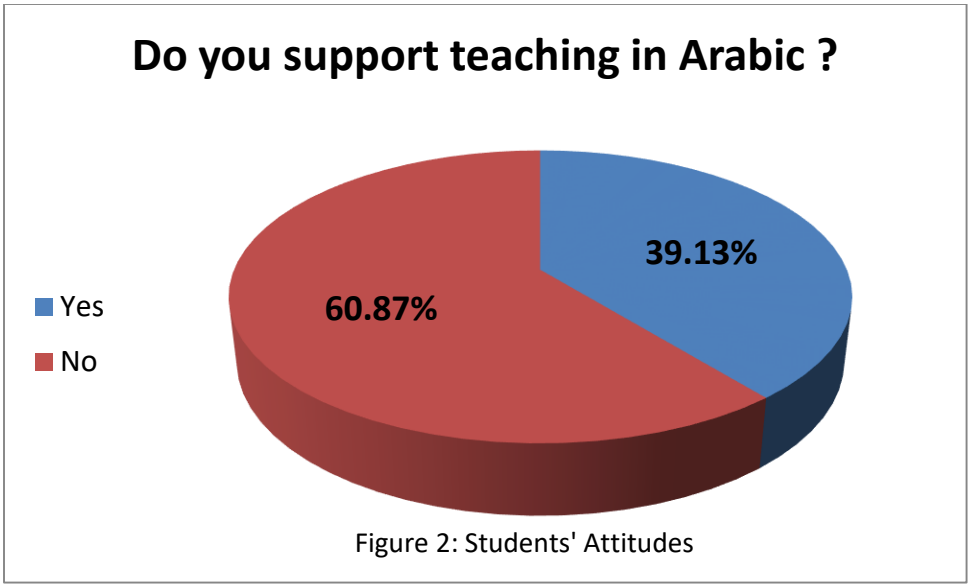

Figure 2: Students' Attitudes

Furthermore, Figure 3 below provides an analysis of the students' responses regarding their experience with studying in English. Those who said the teacher delivers material in English adequately were around 20.16% and 41.94% said the teacher mentions Arabic terms during class. Those who said they translate English texts into Arabic before studying were 37.9%.

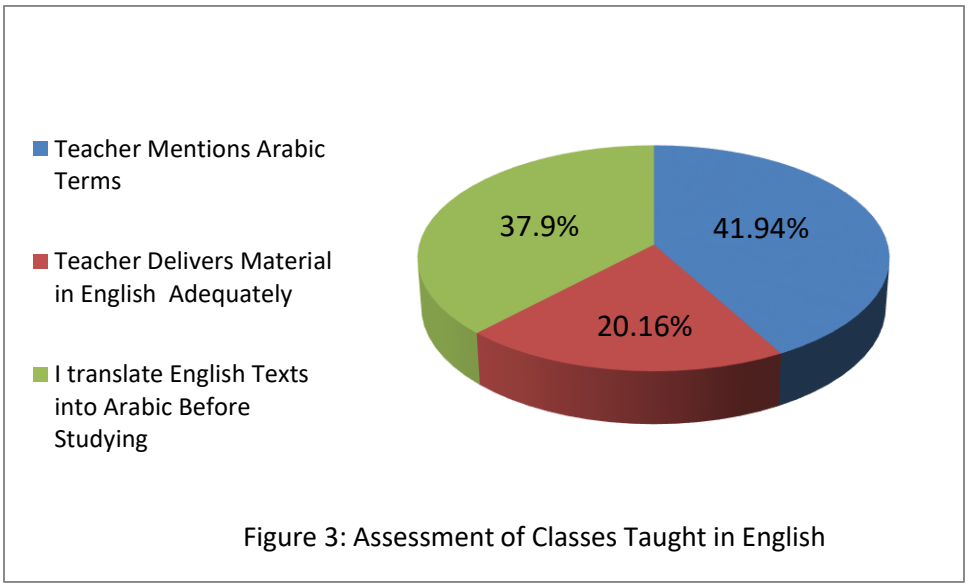

Figure 3: Assessment of Classes Taught in English

Some students had the initiative to answer the questionnaire and encouraged their friends to do so, which is an indication of having difficulty learning in English and eagerness to study in Arabic. See Appendix 2, image 3: Students' Questionnaire.

The responses of the faculty deans were positive, as they suggested coordinating efforts to encourage teaching in Arabic. Despite the fact that the majority of responses among instructors and department chairs were in support of Arabization of natural sciences at the university, most of them said that such a step needs serious plans and may take years to be successfully implemented. This is especially true for those who believe Arabization cannot be successfully implemented as long as Arabic is not a global language. The fact that around 40% of instructors said they incorporate Arabic terms in class reflects the capability of Arabic in transferring knowledge.

The faculty of Architecture at Philadelphia University has set an example of teaching in Arabic. According to the department chair and instructors, classes are being taught in Arabic and English because students are struggling while studying English textbooks. But the department chair believes this does not bring the expected outcomes, since English is the language in which the latest theories and books are written. See Appendix 1, image 4: Part of a Class in Architecture in Arabic and English in Philadelphia University.

Most of the students said they were against studying in Arabic in spite of having a strong command in Arabic. Moreover, Syrian students were argued to be among the most successful students, due to learning in Arabic at the Syrian universities, which is a strong argument for studying in the mother tongue.

Moreover, the fact that 41.94% students said the teacher mentions Arabic terms during class has two indications. First, the English language is incapable of delivering the material adequately because it is not the mother tongue of the students. Second, Arabic is more adequate and capable of conveying scientific materials adequately as a mother tongue. According to only 20.16% of students, the teacher delivers the material adequately in English, which is an indication that students are having an extra load by studying in English. Finally, around 37.9% indicated they translate texts into English, which also reflects the huge effort students are exerting to study materials in English, and the fact that they find it easier to study texts translated to their mother tongue

Limitations of the interviews include the inability to ask deans, department chairs and instructors enough questions, due to their busy schedules. Students were also busy having exams. Some students expressed their preference of learning in Arabic to have an easier rather than efficient education. Moreover, I was unable to reach the students and the academic staff of the Nursing Faculty and the department of Mechatronics as they were busy having exams.

Teaching natural sciences at Arab universities is delivering undesirable outcomes due to teaching in English, the second language of students. Teaching in English increases the study load and harms the overall performance of students, due to the incapability of English to as a foreign language to deliver and transfer information into practical skills. Arabic on the other hand, the mother tongue, has high capacity to encompass rich communication, deliver information adequately.

Some scholar has made experiments to gauge the attitudes of students and instructors and the students' performance, while others studied attempts to standardize Arabic at departments of natural sciences at Arab universities. Literature on Arab Maghreb countries reflected the unfruitful Arabization process there, whereas Syria and Iraq were portrayed as relatively successful examples. Such Arabization projects undertaken at the national Arab level provide a rich reservoir for lessons to be learnt for future endeavors at the Arab regional level.

Interviews were conducted with the Vice-President, deans, department chairs and instructors at departments of natural sciences in Philadelphia University. The results reflect general positive attitudes toward teaching in Arabic at faculties of natural sciences in Philadelphia University.

There are several recommendations to implement Arabization of the natural sciences at Jordanian universities. At the university level, the Ministry of Higher Education should to impose on Jordanian universities to publish several articles and translated books by each instructor each five years, and consider it a condition for academic promotion and recruitment. Universities have also to encourage launching initiatives and contests of Arabization at the faculty, department and university levels.

At the Jordanian national level, sound translations should be carried out at regular intervals. Moreover, there is a need to coordinate the efforts of universities, media and all institutes concerned with Arabization. Arabized texts have to receive extensive scrutiny and assessment to compete with the international ones. Furthermore, academicians and education stakeholders need to be encouraged to translate books in scientific fields and should be rewarded for their efforts. Such books will eventually be adopted as references or main text books. Since English is the language of the modern era, courses in English for special purposes could equip students with the basic terms in their specialization.

At the regional Arab level, there must be a binding decision by the Arab League to enforce translation and Arabization on all Arab universities. For this purpose, the League shall establish an Arabization supreme council and allocate a budget to finance its activities. The council will carry out translation projects on daily, monthly and bimonthly basis for the latest scientific articles and books, and publish books of natural sciences in Arabic. Arab

linguists and academicians from different specializations would gather in this League to assess new scientific terms, scrutinize different translations and agree on common terms.

Only through collaboration and determination can Arab universities overcome all challenges to adopt Arabic as the language of instruction of the natural sciences. This will strengthen the Arab academic system, and act as the cornerstone for the revival of Arab civilization.

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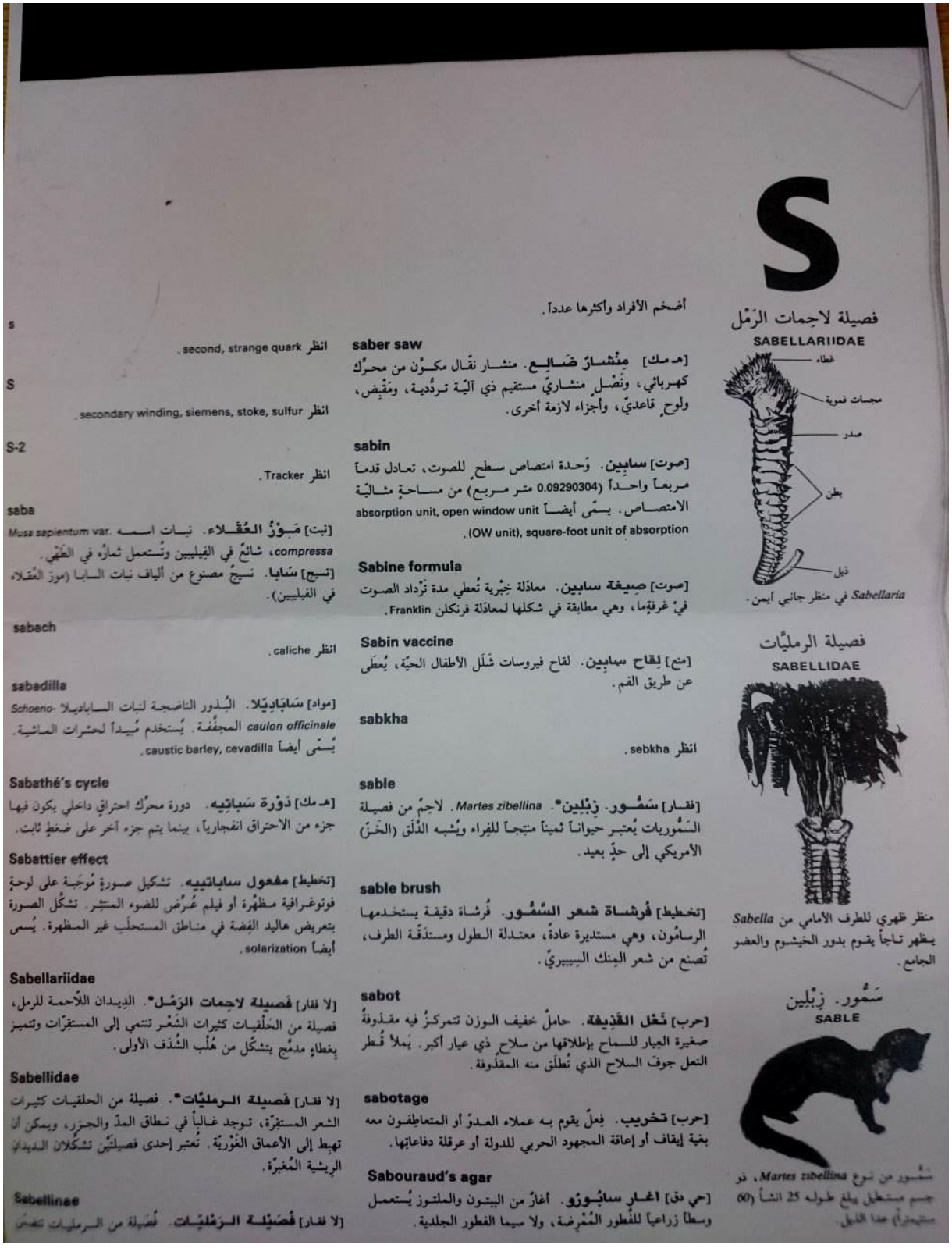
Appendix 1

1. Sample from *The Dictionary of Scientific and Technological Terms*, page: 2851, Fourth Part



S

s
انظر second, strange quark.

S
انظر secondary winding, siemens, stoke, sulfur.

S-2
انظر Tracker.

saba
[نبت] مَوْزُ العُقَلاء. نبات اسمه العلمي *Musa sapientum* var. *compressa*، شائعٌ في الفيليبين وتُستعمل ثمارُه في الطَّهْي.
[نسج] سَابا. نَسيجٌ مصنوع من ألياف نبات السابا (موز العُقلاء في الفيليبين).

sabach
انظر caliche.

sabadilla
[مواد] سَابَادِيلا. البُذور الناضجة لنبات السابادِيلا *Schoeno-caulon officinale* المجفَّفة. يُستخدم مُبيداً لحشرات الماشية. يُسمّى أيضاً caustic barley, cevadilla.

Sabathé's cycle
[هـ مك] دَوْرة سَباتيه. دورة محرّك احتراقٍ داخلي يكون فيها جزء من الاحتراق انفجارياً، بينما يتم جزء آخر على ضغطٍ ثابت.

Sabattier effect
[تخطيط] مفعول ساباتييه. تشكيل صورةٍ مُوجَبة على لوحةٍ فوتوغرافية مظهِّرة أو فيلم عُرِّض للضوء المنتِر. تشكُّل الصورة بتعريض هاليد الفِضة في مناطق المستحلَب غير المظهرة. يُسمى أيضاً solarization.

Sabellariidae
[لا فقار] فَصيلة لاجمات الرَّمْل*. الديدان اللاّحمة للرمل، فصيلة من الحَلْقيات كثيرات الشَّعْر تنتمي إلى المستقِرّات وتتميز بغطاءٍ مدمَّج يتشكّل من هُلَب الشُّدَف الأولى.

Sabellidae
[لا فقار] فَصيلة الرمليّات*. فصيلة من الحلقيات كثيرات الشعر المستقِرّة، توجد غالباً في نطاق المدّ والجزر، ويمكن أن تهبط إلى الأعماق الغَوْريّة. تُعتبر إحدى فصيلتَيْن تشكّلان الديدان الريشية المُعبِّرة.

Sabellinae
[لا فقار] فُصَيْلة الرَّمْليّات. فُصيلة من الرمليات تضمّ

أضخم الأفراد وأكثرها عدداً.

saber saw
[هـ مك] مِنْشارٌ ضَابِع. منشار نقّال مكوَّن من محرِّك كهربائي، ونَصْلٍ منشاريّ مستقيم ذي آليّة ترددية، ومَقْبِض، ولوحٍ قاعديّ، وأجزاء لازمة أخرى.

sabin
[صوت] سابين. وَحدة امتصاص سطحٍ للصوت، تعادل قدماً مربعاً واحداً (0.09290304 متر مربع) من مساحةٍ مثاليّة الامتصاص. يسمّى أيضاً absorption unit, open window unit (OW unit), square-foot unit of absorption.

Sabine formula
[صوت] صِيغة سابين. معادَلة خِبْرية تُعطي مدة تَرْداد الصوت في غرفةٍ ما، وهي مطابقة في شكلها لمعادَلة فرنكلن Franklin.

Sabin vaccine
[منع] لِقاح سابين. لقاح فيروسات شَلَل الأطفال الحيّة، يُعطَى عن طريق الفم.

sabkha
انظر sebkha.

sable
[فقار] سَمُّور. زِبْلين*. *Martes zibellina*. لاجمٌ من فصيلة السَّمُّوريات يُعتبر حيواناً ثميناً منتِجاً للفِراء ويُشبه الدُّلَق (الخَزّ) الأمريكي إلى حدٍّ بعيد.

sable brush
[تخطيط] فُرشاة شعر السَّمُّور. فُرشاة دقيقة يستخدمها الرسامون، وهي مستديرة عادةً، معتدلة الطول ومستدقّة الطرف، تُصنع من شعر الِمنك البيبيريّ.

sabot
[حرب] نَعْل القَذِيفة. حاملٌ خفيف الوزن تتمركزُ فيه مقذوفةٌ صغيرة العيار للسماح بإطلاقها من سلاحٍ ذي عيار أكبر. يَملأ قُطر النعل جوفَ السلاح الذي تُطلَق منه المقذوفة.

sabotage
[حرب] تخريب. فِعلٌ يقوم به عملاء العدوّ أو المتعاطفون معه بغية إيقاف أو إعاقة المجهود الحربي للدولة أو عرقلة دفاعاتِها.

Sabouraud's agar
[حي دق] اغارِ سابورُو. أغارٌ من البيتون والملتوز يُستعمل وسطاً زراعياً للفُطور المُمْرِضة، ولا سيما الفطور الجلدية.

فصيلة لاجِمات الرَّمْل
SABELLARIIDAE
غطاء
مجسات فموية
صدر
بطن
ذيل
Sabellaria في منظر جانبي أيمن.

فصيلة الرمليّات
SABELLIDAE
منظر ظهري للطرف الأمامي من *Sabella* يظهر تاجاً يقوم بدور الخيشوم والعضو الجامع.

سَمُّور. زِبْلين
SABLE
سَمُّور من نوع *Martes zibellina*، ذو جسم مستطيل يبلغ طوله 25 انشاً (60 سنتيمتراً) عدا الذيل.

2. Sample from *the Glossary in Botany*, page: 7

دليل مصطلحات النبات
GLOSSARY IN BOTANY

مختصر لكلمة أنْغْستروم "Angstrom" Å

حرف يضاف الى صدر الكلمة فيعكس معناها (يوناني) a-

حامِض أبْسِيسيك ABSCISIC ACID

هورمون نباتي يكتنف عمليات الانفصال والسبات . (لاتيني)

انفِصال : ABSCISSION

سقوط الاوراق أو الازهار أو الثمار أو غيرها من الاجزاء النباتية . عقب تكون منطقة الانفصال عادة .

مِنْطَقَة الانْفِصَال : ABSCISSION ZONE

طبقة من خلايا نحيفة رقيقة الجدران تمتد عبر سويق الورقة أو الثمرة . ينتج عن انحلالها انفصال العضو من النبات .

امتِصاص : ABSORPTION

اخذ المواد المذابة الى داخل الكائنات أو الانظمة الحيّة .

طيفُ الأمتِصاص : ABSORPTION SPECTRUM

طيف الأمواج الضوئية الذي تمتصه مادة ملونة .

صِبْغَةٌ إضافيّة : ACCESSORY PIGMENT

صبغة تستحوذ على الطاقة الضوئية وتنقلها الى كلوروفيل أ .

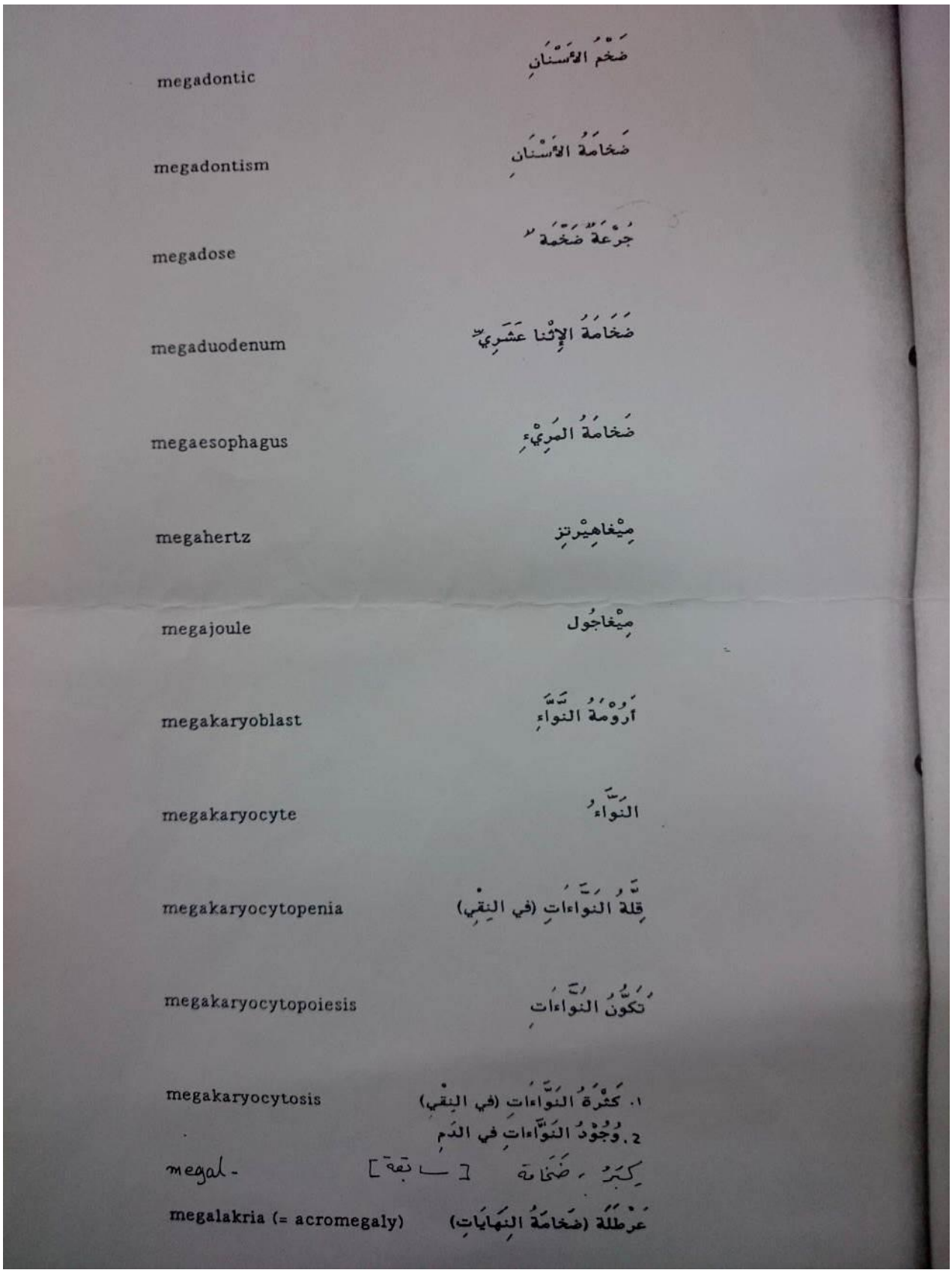
الثَّمَرَةُ الفَقِيرةُ :(يوناني) ACHENE

ثمرة بسيطة . جافّة . وحيدة البذرة غير متفتّحة لا يلتحم فيها غلاف البذرة مع جدار الثمرة .

حامِض : (لاتيني) ACID

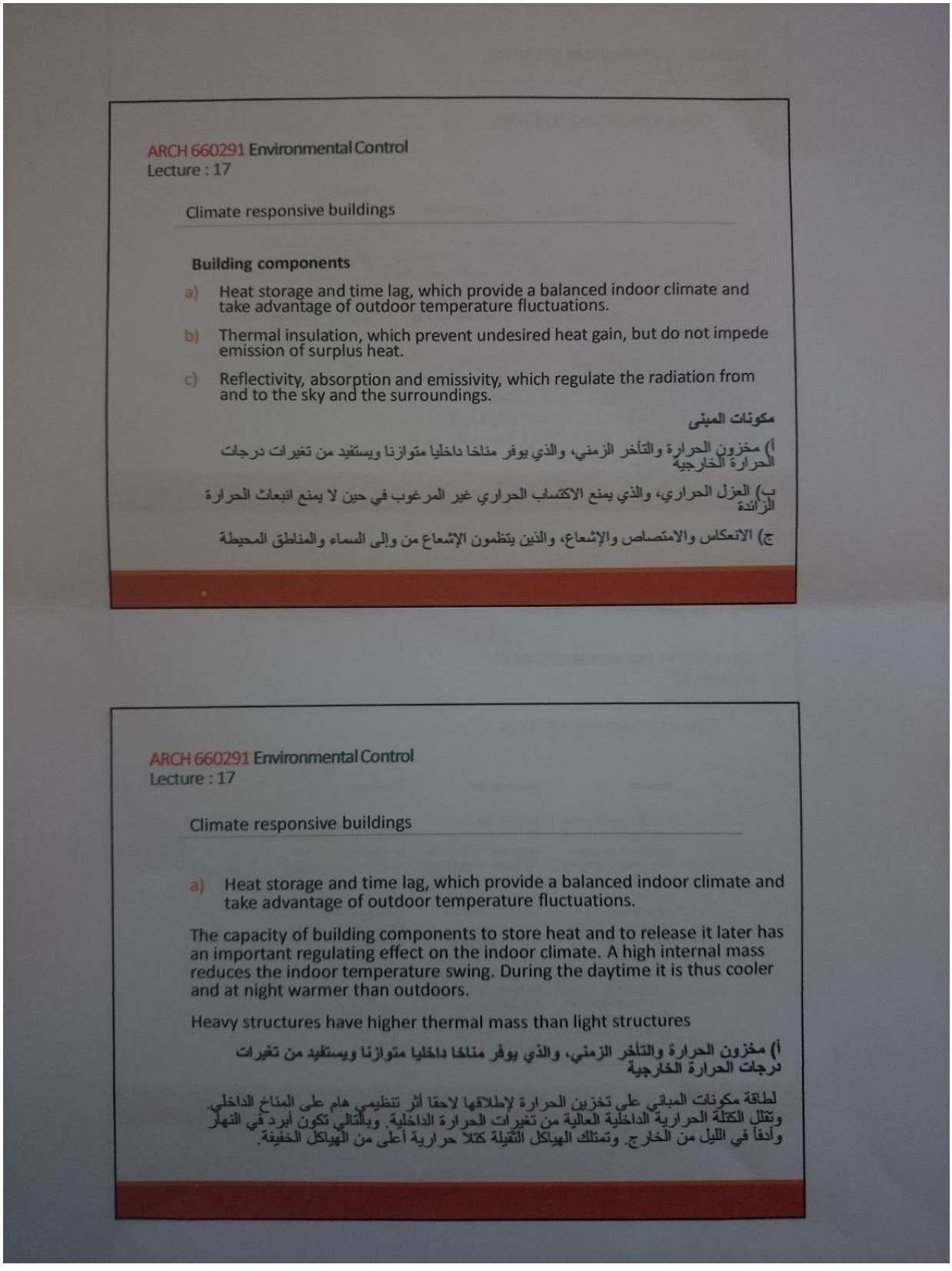
مادة تطلق عند تحلّلها أيونات الهايدروجين . لكنها لاتطلق أيونات الهايدروكسيل . ولها أس هايدروجيني أقل من ٧ . (انظر كلمة قاعدة Base .

3. Sample from *the unified Medical Dictionary*, page: 2628



megadontic	ضَخْمُ الأَسْنَانِ
megadontism	ضَخَامَةُ الأَسْنَانِ
megadose	جُرْعَةٌ ضَخْمَةٌ
megaduodenum	ضَخَامَةُ الإِثْنَا عَشَرِيِّ
megaesophagus	ضَخَامَةُ المَرِيْءِ
megahertz	مِيْغَاهِيْرتز
megajoule	مِيْغَاجُول
megakaryoblast	أَرُومَةُ النَّوَاءِ
megakaryocyte	النَّوَاءُ
megakaryocytopenia	قِلَّةُ النَّوَاءَاتِ (في النِّقْي)
megakaryocytopoiesis	تَكَوُّنُ النَّوَاءَاتِ
megakaryocytosis	١. كَثْرَةُ النَّوَاءَاتِ (في النِّقْي) ٢. وُجُوْدُ النَّوَّاءَاتِ في الدَّمِ
megal-	كِبَرٌ ، ضَخَامَة [ـــ بقة]
megalakria (= acromegaly)	عَرْطَلَة (ضَخَامَةُ النِّهَايَاتِ)

4. Sample of a Class in Architecture in Arabic and English, Philadelphia University.



ARCH 660291 Environmental Control
Lecture : 17

Climate responsive buildings

Building components

a) Heat storage and time lag, which provide a balanced indoor climate and take advantage of outdoor temperature fluctuations.

b) Thermal insulation, which prevent undesired heat gain, but do not impede emission of surplus heat.

c) Reflectivity, absorption and emissivity, which regulate the radiation from and to the sky and the surroundings.

مكونات المبنى

أ) مخزون الحرارة والتأخر الزمني، والذي يوفر مناخا داخليا متوازنا ويستفيد من تغيرات درجات الحرارة الخارجية

ب) العزل الحراري، والذي يمنع الاكتساب الحراري غير المرغوب في حين لا يمنع انبعاث الحرارة الزائدة

ج) الانعكاس والامتصاص والإشعاع، والذين يتظمون الإشعاع من وإلى السماء والمناطق المحيطة

ARCH 660291 Environmental Control
Lecture : 17

Climate responsive buildings

a) Heat storage and time lag, which provide a balanced indoor climate and take advantage of outdoor temperature fluctuations.

The capacity of building components to store heat and to release it later has an important regulating effect on the indoor climate. A high internal mass reduces the indoor temperature swing. During the daytime it is thus cooler and at night warmer than outdoors.

Heavy structures have higher thermal mass than light structures

أ) مخزون الحرارة والتأخر الزمني، والذي يوفر مناخا داخليا متوازنا ويستفيد من تغيرات درجات الحرارة الخارجية

لطاقة مكونات المباني على تخزين الحرارة لإطلاقها لاحقا أثر تنظيمي هام على المناخ الداخلي. وتقلل الكتلة الحرارية الداخلية العالية من تغيرات الحرارة الداخلية. وبالتالي تكون أبرد في النهار وأدفأ في الليل من الخارج. وتمتلك الهياكل الثقيلة كتلا حرارية أعلى من الهياكل الخفيفة.

1. Vice-President and The Faculty Deans' Interview

The Vice Presidents and Deans' Interview

1. Do you support adopting Arabic as the language of instruction in the university?

   Why?

   Why not?

2. The Instructors and Department Chairs' Interviews

Instructors and Department Chairs' Interview

1. Which subject do you teach?

2. Do you believe a teacher's proficiency in Arabic is important?

3. Do you incorporate Arabic terms equivalent to English ones during class?

4. Can Arabic be the language of instruction in your field? Why?

Yes

No

3. The Students' Questionnaire

Questionnaire for BA Students Attitudes

Specialization:

Arabic Language proficiency: ——————————

English Language Proficiency: ——————————

Answer based on what your experience in the class:

	Agree	Neutral	Disagree
Teacher			
Teacher incorporates Arabic terms equivalent to English ones			
Teacher delivers material in English adequately			
Student			
I translate texts into Arabic and study them			

Can Arabic be the language of instruction?

_____

Yes

_____

No

_____.

Contents