

Computing Educators Oral History Project

An Interview with *Hal Abelson*

Conducted Tuesday, March 1, 2012

In Raleigh, North Carolina, USA

Interview conducted by Barbara Boucher Owens

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1 [0:00]

2 **Barbara Boucher Owens:** Okay, let me start this interview by saying that this is an
3 interview for the [Computing] Educators Oral History Project. Being interviewed today
4 is Harold (Hal) Abelson of MIT. This is March 1, 2012. We are in Raleigh, North
5 Carolina. Did I get all that information correct?

6
7 Harold (Hal) Abelson: That sounds all right, Barbara.

8
9 **B: All right!**

10
11 H: Pleased to be here. Pleased to be interviewed.

12
13 **B: Good. This project is pathways. And so we're going to start way, way back when and
14 I'm going to ask you about your parents' education. Did your parents have college
15 degrees?**

16
17 H: My parents did not have college degrees. None of my ... my father had two brothers. Neither
18 of them had college degrees. My mother had, I think, three brothers, one of whom went to
19 college, and she couldn't go to college because — even though she was probably, I think, the
20 smartest and certainly did the best in high school — but, of course, since the family could
21 only send one person to the college they were going to send the boy to college. And so she

22 didn't have a college background but was very, very educated. Both of my parents were very,
23 very firmly committed to education but didn't actually have college degrees.

24

25 **B: Were ...**

26

27 H: I suppose in the words of Rick Santorum they were not snobs,¹ right? Am I allowed to say
28 that in this interview?

29

30 **B: [laughs] Yes, of course! It may need a little bit of explanation in a few years but ...**

31

32 H: Okay.

33

34 **B: Were either of them particularly good in areas that you might consider — looking back**
35 **— as would be good as computer-related things, like math or science that you ... ?**

36

37 H: Mmm. My mother was good at math. My mother was very methodical, very kind of
38 methodical, organized mind. At one point, she was a legal secretary and was very good at
39 that. And I think I picked up a lot of those habits of precision from her.

40

41 **B: Hmm.**

42

43 H: My father, back in the old days — in World War II — worked in the naval depot in Hoboken
44 [New Jersey]. I don't think he had ... he wasn't quite the same sense of organization that my
45 mother is, but very, very solid. He was very ... very, very responsible person and cared a lot.
46 Was a very good manager later. Later in life he worked as a supervisor in the post office.

47

48 **B: What did he do when he was at the naval yard in Hoboken?**

49

50 H: I think mostly just working in the shipping yard doing support and doing supplies and things.
51 But most of his career he actually spent as a postal supervisor. And again ran a lot of things
52 and was very ... mostly things about being very responsible and very organized.

53

54 **B: What were your parents' attitude — you said that your mother believed in education ...**

55

56 H: Well, they both did, very, very much.

57

58 **B: ... very, very strong. How did they manifest that?**

59

60 H: Mostly supporting me and my sisters in that. Caring a lot about it. Doing the normal things of
61 taking you to classes. Enrolling you in things and caring about stuff. Letting you know that
62 they were very proud of you. Caring a lot about the things that were of interest to you.
63 Always giving the message that you should do extremely well.

¹ Reference to a statement by Republican presidential hopeful Rick Santorum in February 2012. In a speech at the Americans for Prosperity forum in Michigan, Santorum said "President Obama once said he wants everybody in America to go to college. What a snob."

64

65 **B: Well, did your sisters go on to college?**

66

67 H: Oh yes. Both of my sisters went to college.

68

69 **B: What kinds of things did they do?**

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71 H: One of my sisters is a professional musician. She went to Hart College of Music in Hartford
72 and is a violinist still. She plays in various orchestras, mostly backing up Broadway shows
73 and things. She got to travel with the Rat Pack², which is one of the ... does that need a
74 reference too?

75

76 **B: We'll put it in if needed!**

77

78 H: We'll put it in.

79

80 **B: [laughs] Probably the younger generation is going to say "huh"?**

81

82 H: Yeah, right. My other sister was an English major and she went to Rutgers University. And
83 she's now ... owns a real estate agency.

84

85 **B: I would say they're varied except that I know that you're musical as well.**

86

87 H: I'm ... yeah, I'd say I used to be. Right.

88

89 **B: How did it become a "used to be"?**

90

91 H: Well, I made this mistake of saying I was too busy to practice because I was doing other
92 quote "more important things" like trying to teach classes and write my thesis and things like
93 that. So I was a pretty good clarinetist but I've let that lapse a lot. Keep telling myself that
94 someday I'll get back to it.

95 [5:12]

96 **B: I'll tell you a story some day. Were you given the same educational training options as
97 your sisters by your parents? The same aspirations? Did they treat the sisters
98 differently from you? It's not a gender thing, it's just you're the oldest ... ?**

99

100 H: Well, there might have been a little bit because I'm the oldest. But I think it was much more
101 of looking at aspirations. I was much more the one who was interested in math and science.
102 But I wouldn't have said that my parents supported my sisters any less than that. Because my
103 second sister went on to a music career and again got tremendously supported through that.
104 And my third sister was doing English and was very organized and always making things
105 happen. So I think we all got supported. But of course, I think you're right. It's always a little
106 different with the oldest.

² The Rat Pack was the name used during the mid-1960s by the press and the general public to refer a group of actor friends that included Frank Sinatra, Dean Martin, Sammy Davis, Jr., Peter Lawford, and Joey Bishop.

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B: Can you think of any ... you think you said your mother was quite methodical and that shaped you, you believe. Were there any other shaping influences? Can you think about a school teacher? Or can you remember back through that elementary, secondary education? People that made a difference or things that made a difference?

H: Oh dear. I mean elementary education, I can't think of ... other than teachers were good and influential, I can't think of what was very special in that. I had a high school geometry teacher who I think was very, very special. Cared a tremendous amount about teaching mathematics. Was a friend of my father's, in fact. That was later, after I'd gotten out of high school. But those things shaped a lot. The school also. I went to a regular public school which didn't have any advanced math courses or things like that. They did a special thing where they got a tutor to come and help me go through calculus, when I was, I think, in eleventh grade. So that was pretty important.

B: When you said "they", was it the school?

H: The school. But I think that one geometry teacher had a whole lot to do with that.

B: That must have made you feel engaged to have them help you. Did you ask or did the teacher suggest? Or ...

H: No, no. I mean, you're a kid, you don't ... you take that stuff for granted when you're a kid. "Well, they're doing this for me." You don't actually think about what it takes in the back end to make that stuff happen.

B: Yeah. Cool. Did you know anything about computing during these high school days? Were there ... ?

H: Yeah. I got a job — I want to say with an IBM 709 ...

So I lived near the Lakehurst Naval Air Base, which is the place that held the blimps and hangars and things. And they had a computer and I got a job programming it, programming the paper tape computer stuff. So it would have been ...

B: How?

H: I don't remember how I got that. I wonder if my father knew someone, who made a link or something. But I was one of the people who fed these paper tapes through the computer and there was this mysterious language called Fortran and I did a little ... a *little* bit of that. I don't even remember what project I was working on. I just remember sort of playing around, running tapes through the computer. And writing these ... what in those days seemed impressive, but now seems like a tiny, tiny, tiny little program. And of course it was one of the first ones that was around. So it was kind of mysterious and fun and you pretty much didn't have any idea what you were doing.

153 **B: Can you remember how you got there? Did your parents drive you there? Did you take**
154 **public transportation? Do you remember, was it an effort?**

155
156 H: Well, sometimes my parents drove me there. It was about ten, twelve miles.

157
158 **B: That's a lot!**

159
160 H: Then occasionally the guy who I worked for drove me home because he kind of drove very
161 close to my house on the way back. So, I remember doing that.

162
163 **B: Was it a summer job or after school?**

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165 H: It was a summer. God, I don't remember. I think part of it was a summer job. Must have been
166 a summer job because we had pretty long hours.

167
168 **B: Wow! Little did you know, huh?**

169
170 H: Little did I know. Right.

171 [9:58]

172 **B: Little did you know ... Were there other science or math things at that early part that**
173 **you remember?**

174
175 H: Well, yes, my parents ... So my mother's brother — the one who went to college — he
176 actually ended up being very successful. He worked for what these days is called Exxon but
177 in those days was called Esso, and he was a vice-president. He was always the one who was
178 held up as "the scientist." So, that was somebody to sort of respect and emulate and see that
179 you could be successful in a scientific career.

180
181 **B: Well, you graduated from high school. Is there anything that you remember, even about**
182 **the graduation. What were you ... Do you remember that?**

183
184 H: Now that you are asking, I don't remember anything special. I think I was class valedictorian
185 or something. And I just remember doing really well. But as usual, you have different
186 impressions of that when you're in high school. It all seems pretty misty now. And, let's see.
187 I mean, mostly I remember high school as a place I wanted to get out of.

188
189 **B: Did you have any good friends that were in math or science at the time?**

190
191 H: I had a lot of good friends, not especially around math or science or anything. Just ... I don't
192 know, that seems like a different era. You didn't specialize that much. You just kind of had
193 good friends and you hung out. And, of course, you took various courses together.

194
195 **B: Well, if you were playing the clarinet were you in a band at that time?**

196
197 H: Yes. I was in a band.

198

199 **B: Marching band or concert or ... ?**

200

201 H: It was all the same in high school. There are various state competitions. There were state
202 bands that you got into, all-state band and things like that.

203

204 **B: And did you have ribbons from your individual level ...**

205

206 H: I don't remember if I had ribbons.

207

208 **B: Or you got a [rating of] 1 or 2. We used to get ... You don't remember any of that.**

209

210 H: I don't remember getting any ribbons.

211

212 **B: Well, during this period of time you were thinking about college, obviously. How did**
213 **you go about that thinking and making the decisions that you did?**

214

215 H: Well, the usual way. You ask somebody you think you know. I think the guy who was
216 tutoring me in calculus. And you say things like, "Well, what sounds like a good school?"
217 And they say, "Well, I don't know. Princeton sounds like a good school." So I figured I'd
218 apply to Princeton. Applied to a bunch of places.

219

220 But mostly again, you don't know. It's very ... the thing that people need to understand is
221 that this is all very random and you don't plot things out. Most things that happen in life
222 happen for pretty random reasons. So I don't know that there was a very deliberate thing. So
223 I mean the reason I went to Princeton eventually was I got a good scholarship there. Because
224 my parents really couldn't afford this very much. In those days, I think there were better
225 scholarships also.

226

227 **B: Yeah, fewer loans.**

228

229 H: Yeah.

230

231 **B: So tell me about when you were at Princeton. You knew you loved math. How did you**
232 **... did you choose it as a major? What did you choose as a major? What are some of the**
233 **courses and professors that you remember the most about? Good and bad.**

234

235 H: Well, I went to Princeton knowing that I was going to major in math. I don't remember when
236 I decided I was going to major in math. I remember when I was, I don't know, 13 or 14
237 [years old], I was quite sure that physics was cool and I was going to be a physicist. I ended
238 up never taking any physics in college.

239

240 When I went to Princeton, Princeton had a program which they ... which was a very 1960s
241 kind of program, which was called the University Scholar Program. And it is something that
242 more universities should do. Even Princeton stopped. The University Scholar Program. You
243 got in and you sort of had no requirements. They said, "Gee, you're in. You're smart. Go
244 learn what you can from around here!" You had departmental requirements, but you had no

245 university requirements. So that you sort of had a lot of fun at Princeton getting deeply into
246 mathematics because I didn't have to worry about much else. And that was tremendous fun.
247 So you get to hang out mostly with the graduate students, in those days, in the math
248 department. I thought that was a great system. But I think Princeton dropped it about 10 years
249 later.

250 [15:08]

251 **B: So you didn't take any of the other liberal arts?**

252

253 H: Well, I actually took way more of those! What I didn't take is a lot of other science. So I took
254 ... I don't know, the standard array of interesting courses that you would take, like Russian
255 cultural history and Zen Buddhism and courses in the writings of Joyce and sort of
256 interesting things. Not all those boring intro science courses.

257

258 **B: [laughs] You seemed to have learned a lot of science along the way.**

259

260 H: Mmm, you pick it up. After a while, you pick it up.

261

262 **B: Can you talk about any particularly influential professors? You talked about the**
263 **graduate students.**

264

265 H: There was an enormously ... *is* an enormously influential professor, a guy named Ralph
266 Abraham, who was sort of ... I guess in those days you would have said a kind of "hippie"
267 professor. A little too much for Princeton. But he had a tremendous personal influence on a
268 bunch of us because he, to me, showed that it really is not about the content of what you
269 teach. It's about the personal style that you set as a faculty member and the role model that
270 you choose and the notion that you can be dedicated to the intellectual life.

271

272 He actually organized a group of undergraduates ... He convinced McGraw-Hill³ that he was
273 going to write a whole sequence of mathematics textbooks and it was going to be written by
274 him and his students — undergraduates and graduate students. And he arranged, for example,
275 that we went to France one summer and hung out in some farmhouse in southern France and
276 wrote a calculus book. That was actually my ... that was actually the first book I wrote. I did
277 it with two people in that group. And it was called the Eagle Mathematics Series. And so I
278 wrote a calculus book, which, as I look back on it, was just a terrible, terrible book. But it
279 was tremendous fun. Tremendous fun doing that. There's a whole series of Eagle
280 Mathematics, of which a couple of the books are good; not the ones that we wrote.

281

282 **B: Are any of them still in print?**

283

284 H: I doubt it. This is in ... would have been — gosh — 1966 or something. But...

285

286 **B: What an opportunity.**

³ McGraw-Hill is a textbook publisher: <http://www.mcgraw-hill.com/>

From their website: "Founded in 1888, The McGraw-Hill Companies is a leading global financial information and education company that helps professionals and students succeed in the Knowledge Economy."

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H: Yeah. It was tremendously good.

B: How did this professor justify dragging you off to France to write this book when you could ...

H: Because it was fun!

B: ... have written it in New Jersey?

H: Well, because one of the other ... there was another professor in that group; he had a farmhouse that he bought in southern France. And why not?

B: Wow!! [laughs]

H: So that was one summer. We actually ... it was actually planned for two summers. And the second summer was — must have been in 1968 — where we did the same thing. We lived in Berkeley. And 1968 in Berkeley ... 1968 summer in Berkeley was just a wonderful, wonderful time, because that was when the police were tear-gassing the students.

B: Right.

H: And you got to go out and yell, “Disarm the pigs!!” with everybody else. So we did that at night and in the daytime, we sat around and wrote a — I think a linear algebra book or something like that.

B: [laughs] Wow! Repeat that professor’s name again.

H: Ralph Abraham⁴. He’s retired now, but he’s still around. He left MIT and went to University of [California at] Santa Cruz. He was a pretty famous ...

B: Wait! You were at Princeton.

H: Oh, I’m sorry. I meant Princeton. I misspoke.

B: And so he went to Santa Cruz.

H: Yeah. So he left Princeton — maybe my senior year or something — and then went to University of Santa Cruz. Got a ... sort of a distinguished professor position there because he’s very, very renowned in differential geometry and topology and things. And about a year after he got there, they saw his true radical colors. He did these things that you just didn’t do as a faculty member at the University of California. Like going to a rally wearing an American flag shirt. So you might remember in those days, you weren’t allowed to desecrate the American flag by putting it on your clothes.

⁴ <http://www.ralph-abraham.org/>

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B: Mmm hmm.

[19:52]

H: What I heard is that they tried to get ... that having given him tenure, they tried to get rid of him almost from the year after he started. They never did get rid of him. Again, I'm sure he did wonderful things at Santa Cruz. He wrote a column for the student newspaper called "Dr. Clear-quill," where I'm sure he said all sorts of things that the administration didn't like.

But for me he was ... he really stood out as an example of how as a teacher you have to show people who you are. You have to have a personal life; it's just not ... it's not just about standing up in a classroom and explaining the material or even explaining it very well. It's about really being a person and showing people that that matters. And that had an enormous influence on me.

B: So, you finished Princeton after — what a career! I mean, France and Berkeley as an undergraduate and you're choosing a graduate school. How did MIT get into the ... you did go to MIT for graduate school, is that correct?

H: I went to MIT.

B: How did you ... how was that path and were there choices that you were making between MIT and something else?

H: Yeah, I guess. Maybe MIT and Berkeley or something. Again, in those days, if you remember the environment, right, of the late 1960s, and you think about, "Well, where are the places you want to be?" Right? So the ones that stand out in that are you *want* to be in Cambridge or you'd *like* to be in Berkeley and you're vaguely aware that maybe there are some other places. But the reality is, first of all, MIT gave me one of those 3A things that were good for a draft deferment — because the draft was a very big thing. And plus my wife — well, we weren't married then — but my wife-to-be got into BU School of Social Work⁵. So on top of this we had a two-body problem. So MIT seemed like the only place.

B: I'll back up. We didn't ... I didn't hear about the wife. I heard about the other graduate students that you were working with.

H: Well, she was my girlfriend in college.

B: So you met her at Princeton?

H: I met her when the Princeton band went on tour to Wilson College, where she was.

B: Where's Wilson College?

H: Wilson College is in central Pennsylvania.

⁵ Boston University School of Social Work, <http://www.bu.edu/ssw/>

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B: OK.

H: So ... it's a women's ... it still is a women's college.

B: Was she a mathematician or a musician or both?

H: None of that. She was very interested in social welfare and she went to social work school. So she got into the School of Social Work at BU. Went through the program there. And we both stayed in Cambridge [Massachusetts] and studied.

B: Did she go to Berkeley or to France or she was ...?

H: No, she actually ... the summer I went to France, she was volunteering at a school for autistic kids in Saratoga.

B: California?

H: In Saratoga, right. We wrote each other letters and I was writing them from France.

B: And the summer you were in Berkeley, she was ... ?

H: I don't remember where she was the summer I was in Berkeley.

B: Probably the other coast!

H: I think so.

B: Oh, OK! That's interesting. So ... back up just a bit. Computers were just starting to be used in university during the period you were in college. Were you ... did you use them in any of your course work or ... ?

H: Yeah and I'm trying to remember why. Well not ... in course work. Well, there was very little course work that involved computers. I took a course in — let's see if I can remember what the name of the course was. I don't remember what the course was about. It was taught by Hale Trotter, who was a pretty famous applied mathematician at the beginning of computing in those days. And we used this strange book that just came out called *Fundamental Algorithms* by this guy named Knuth and we all thought that was really cool.

And I remember we were doing a project that had to do with writing a symbol table. We said we wanted to learn something about compilers. And Knuth was actually visiting on campus once — I don't remember if he was there for the whole year — and we heard ... because, when you picked up *Fundamental Algorithms*, there was a whole outline of — what, was there going to be 8 volumes or something...

B: Mmm hmm.

421
422 H: And he had the whole thing laid out. And this was probably 1967 or 1966 or something. And
423 so we found this guy who was visiting and we said, “Professor Knuth, could you show us the
424 manuscript for volume ... ” — I forget what it was — “... 5 or 6?” or something, which was
425 supposed to be about compilers. And he said something like, “Well, it’s not quite ready yet.”
426

427 **B: [laughs]**
428

429 H: And of course, when did it come out, if ever? 25 years later or something? So I remember
430 that. So I took this computing course.
431

432 But what I really did, I worked in the computer center. So that’s probably because I had some
433 background from when I was in high school — not that it was relevant at all — and I learned
434 this language, I don’t know if you remember there was a language that IBM came out with
435 that was going to change the world and revolutionize computing.

436 [25:34]

437 **B: PL/I.**⁶
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439 H: It was PL/I, right, because — remember? — it could do everything. And I got a job — they
440 called me “The PL/I Kid” because my job was to go consult with the faculty members who
441 were translating their programs from Fortran or whatever it is and showing them how this
442 new arcane language worked. We sort of did that and I hung out around the computer center
443 doing that.
444

445 I also got a job writing a records input program for the Dean of Graduate School, who had
446 this idea that you could computerize the graduate school records. Looking back on it, I just
447 did a totally horrible job. I can’t believe what a bad program I wrote and inflicted it on the
448 poor person who had to input that information all on punch cards⁷ at first.
449

450 **B: And *that* might need a footnote sometime.**
451

452 H: Punch cards?
453

454 **B: Yeah.**
455

456 H: Yeah, right. Right. Sort of amazing.
457

458 And then IBM was ... it was a 7094 at Princeton that we used. But they also had this
459 newfangled machine called a 360. And they were doing this ... again, outlandish stuff with a
460 system called HASP. Or it was ASP and there was a thing called Half-ASP. And they were
461 doing these experiments with time-sharing on it.

⁶ PL/I is pronounced “pee ell one”. For a brief description and a pair of sample programs, see
<http://groups.engin.umd.umich.edu/CIS/course.des/cis400/pl1/pl1.html>

⁷ For a history of punched cards with illustrations, see the series that begins at
<http://www.computerhistory.org/revolution/punched-cards/2>

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463 And then along about our senior year what a bunch of us did is we did this complete waste of
464 computer time. Which is we were typing ... we were doing text inputting on this computer. I
465 remember writing my senior thesis and using — I guess it was typeset and run off or
466 something — to actually print this stuff. And of course many of the science faculty were just
467 totally upset by this, that the computer center was taking these computers, which, of course,
468 were meant for solving Einstein's equations and doing serious kind of work, and they were
469 doing this utter complete useless waste of computing, which involved getting people to do
470 text processing on that. So I remember that being the subject of a lot of complaints, about
471 how could we be wasting these computer resources on this useless thing that had to do with
472 text processing! So that was a lot of fun.

473
474 **B: So, when you graduated from Princeton you had a lot of experience with computers.**
475 **Math was your, it sounds like, was your love.**

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477 H: At that point, I had a lot of experience.

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479 **B: So you applied to MIT. And did you apply to Berkeley as well, or just MIT?**

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481 H: I don't seem to remember. I don't remember, it's just ...

482
483 **B: But you were interested in math; I mean, you were applying for the math program.**

484
485 H: Right. I got into MIT for math and I got a sort of nice TAs hip for math.

486
487 **B: And then talk about ... talk about MIT and your graduate ...**

488
489 H: Graduate ...

490
491 **B: Yeah, your graduate program and ... did you go in knowing you were going to get a**
492 **Ph.D.? Or did you think a Master's and then a Ph.D.? Or what was your ...**

493
494 H: I was thinking ... I didn't get a Master's. So ... yeah, actually, the math department at MIT
495 — and it may still be true — that you don't get a Master's; you go directly into the Ph.D.
496 program. Some of the science-y parts of MIT sort of, I think, pride themselves on they don't
497 merely give a Master's program, you go straight into a Ph.D. program and you're a "serious"
498 student.

499 [29:29]

500 I don't know. MIT's a very big place. I mean, I think I finally figured out MIT after about 30
501 years there. But when you first go there, it's just overwhelming. You end up in one building
502 in one hall and you see a small number of people and eventually you do some activities,
503 which are meant to get you out. But it takes a tremendously long time before you can get a
504 sense of the place as a whole.

505
506 I mean, I remember just coming up to MIT and there's sort of these green automatic doors
507 that opened when you stepped on the carpet in front of them. And I just sort of cracked up

508 because I was coming from Princeton, which is the ivy-covered halls and things. And here
509 was this place you walk in and the first thing you see are these automatic doors⁸ leading
510 down this long, long corridor. Those same ... those doors are still there, by the way. It's sort
511 of the pride of MIT to have these Krufte doors, which they had to adjust because they now
512 stay too open and cause a large heating bill. But that actually happened two years ago. But I
513 just remember just thinking it was funny. And it was so not anything like a university. Those
514 were my first impressions of MIT.

515

516 **B: So talk to me a bit about the Ph.D. experience.**

517

518 H: Oh wow! So, again, I was in the math department. And the math I did was algebraic topology
519 for a very outstanding, outstanding professor named Dennis Sullivan.⁹ And I did a pretty
520 straight Ph.D. in topology. Nothing academic around computers then. The computing was all
521 in the job I did as a research assistant in an area that had almost nothing to do with my thesis.

522

523 **B: So talk about that.**

524

525 H: Well ... so the nice thing that was happening at MIT those days is that the students were
526 demonstrating against ... what in those days were called the Institute Labs, which was doing
527 government-sponsored research. So those were the days of the Students for a Democratic
528 Society,¹⁰ when a lot of the SDS organizations were protesting on campus and occupying
529 stuff on campus. And so it was sort of fun to, again as a new graduate student, to smell the
530 tear gas that was being lobbed. That was a very atypical era in MIT, but even MIT was part
531 of it.

532

533 But one of the things that students did is they occupied the president's office. And they had
534 fun in those days putting the old tapes from the IBM Selectric typewriters¹¹ in so that they
535 could replay the correspondence that was written by the president's office. So I walked by
536 there and I said, "Gee, you know, here I am a new graduate student. I mean, when am I ever
537 going to get the chance to go see the president's office? I'll never be in the office of the
538 president of MIT." So the folks who were sitting in held an open house and I said, "Gee, I'll
539 go to the open house in the president's office!" And walked in and there were all sorts of
540 people sitting around on the floor. And one of the guys sitting on the floor was a guy I went
541 to high school with and hadn't seen at all when I was an undergraduate. I knew he'd gone to
542 MIT. And I came up to him and I said, "Hi! Having fun at MIT? That's good." He said
543 "What are you doing here?" And I said, "Well, I'm looking for a job." And he said, "Oh!
544 You ought to go ... there's people over in the Artificial Intelligence Laboratory. I hear that's
545 a nice place to work." And so I kind of wandered around there.

546

⁸ The Magic Eye doors of Building 7 at MIT, <http://museum.mit.edu/nom150/entries/1494>

⁹ <http://www-history.mcs.st-and.ac.uk/history/Biographies/Sullivan.html>

¹⁰ Students for a Democratic Society (SDS), <http://www.sds-1960s.org/>

¹¹ Article from 2011 about 50th anniversary of IBM Selectric typewriters, <http://www-03.ibm.com/press/us/en/pressrelease/35140.wss>

547 **B: So this ... you learned about the job at a sit-in. The guy's sitting in the president's**
548 **office.**

549
550 H: Yeah, right. Well, I think people need to understand that that's how things happen.
551

552 **B: Usually not a sit-in but ... [laughs]**

553
554 H: Not any more, but equally random things. I mean, these days I like to remind students ... I
555 get students who come in now and want to have their whole career planned out. I was just
556 judging some projects by students this year. And one, he'd made a course planner where you
557 could come in and consult the catalog, plan out your entire career when you're a freshman
558 for four years. And I always have a very funny attitude towards that. Students have this very
559 definite idea that things are definite and are very upset by things that are random.

560 [34:50]

561 But in any case, I wandered over to the Artificial Intelligence Laboratory and heard there was
562 going to be a presentation on this thing called Logo by a guy named Seymour Papert. So I
563 went to this talk and it just blew my mind about what an incredible wonderful thing it was.
564 And I went off thinking about that. And I was wandering more about the Artificial
565 Intelligence Laboratory and got into the elevator of the building. And the door sort of opened
566 two floors higher and in walks Papert. And I said, "Gee, hi! I'm a new graduate student at
567 MIT, you know, looking around for a job." And he said, "Oh, do you know who you're
568 working for?" And I said, "Well, can I work for you?" And he said, "Yes, you can work for
569 me."

570
571 So that's how this whole thing started, as a very sequence of random events. And I think it's
572 worth really appreciating the importance of randomness. So that's pretty much how my work
573 that became my actual career started.
574

575 **B: But you bifurcated and you did work in the AI lab for your sustenance.**

576
577 H: Research assistant.
578

579 **B: ... and you did math ...**

580
581 H: I was doing algebraic topology.
582

583 **B: ... and your thesis was in algebraic topology and you ...**

584
585 H: Right, I had very little, essentially nothing to do ... other than some of the ideas in computing
586 were related to topological ideas.
587

588 **B: Again, how much time ... what was the time span that you were...**

589
590 H: You mean how much time ...
591

592 **B: Yeah, how much time did it take with the degree? So, how much time working ... how**
593 **many years did you work in the AI Lab?**

594
595 H: Oh, I started in 1969. Got my degree in 1972 or 1973.

596
597 **B: So it was rather short in terms of Ph.D. time.**

598
599 H: It was kind of short for MIT ... well, it was short by the terms of MIT computer science.
600 There's a joke which says, "How many MIT computer science graduate students does it take
601 to change a light bulb?" And the answer is, "Only one but it takes seven years!"

602
603 **B: OK.**

604
605 H: MIT's been worried about that and its Ph.D. program for a while now. We've compressed the
606 time some, but it still takes an awfully long time for some people.

607
608 **B: So, you were married at the time. You've ... so you ... were there children or just you**
609 **and your wife?**

610
611 H: Well, we have one daughter now, but she wasn't born until long after. She wasn't born until
612 1976.

613
614 **B: So, you got your degree in 1972, 1973, you said?**

615
616 H: Yes, I think it was 1972 or something.

617
618 **B: Mmm hmm. And did you stay then at MIT? Did you go off ...**

619
620 H: Yeah. Yeah, we stayed. I stayed. I got a job as an instructor in the math department, again
621 doing topology. And she ... when did she graduate? She got her ... even before that. She got
622 her Master's in Social Work. I don't remember what year, but I think it was before 1972.
623 Must have been 1971; it was probably a two-year program. And then she got a job at a ...
624 what in those days was the Worcester Youth Guidance Center doing social work. And we
625 just stayed.

626
627 **B: You're in the math department. But I know you're not in the math department now.**

628
629 H: Right.

630
631 **B: So how did this career move? How did ... ?**

632
633 H: So there are two things that kind of happened simultaneously. Because MIT started
634 something called the Division for Study and Research in Education, which lasted ... oh, I
635 want to say five years, but maybe not even that. And one ... it was kind of built around three
636 senior faculty members, each with a research program. One was Seymour Papert and Logo.
637 The other was a guy named Benson Snyder who was a psychiatrist and wrote a famous book

638 about MIT called *The Hidden Curriculum*, which basically said what students needed to learn
639 at MIT and the main thing they learned was how to do triage when they had over-
640 commitment. And the third person was Don Schön, whom Fred Brooks actually mentioned
641 this morning in his talk [during the 2012 SIGCSE Technical Symposium], who had these
642 whole theories of what he called practice and espoused reasons, endowed reasons or
643 something. So that was this division that came together to study that. And I started working
644 there ... I got a part-time appointment when I was in math, working in that doing Logo,
645 because at that time the Logo stuff had become very serious. And then ... so eventually what
646 happened is I moved into the Division out of the math department. And then the Division got
647 closed and I moved into the Electrical Engineering / Computer Science department from that.
648 So that's how I ended up in EECS, sorry, Electrical Engineering and Computer Science.

649 [40:45]

650 **B: Were you still an instructor or did you get into a tenure track line ... ?**

651
652 H: I was an instructor and then I was a lecturer. But then I think I was not an assistant professor.
653 I think the assistant professor came with the education division appointment, or the original
654 computer science appointment. And again there was a transition there, because some of the
655 earliest stuff I did, like in real computer science, had to do with parallel computing and some
656 of that was related to the algebraic topology.

657
658 **B: So, did you have ... at that point, were there particular students that you remember?**
659 **Do you remember ... how much time did you spend in the classroom?**

660
661 H: Well, in those original days, I was doing pretty standard teaching. I was teaching, gosh, linear
662 algebra. I was teaching calculus. Doing the standard stuff you do as an assistant professor in
663 math. And then we did seminars in the education division thing for a few research students.

664
665 **B: What kind of seminars were you...?**

666
667 H: Well, mostly things about Logo and doing projects and talking about them. I don't remember
668 exactly who was involved in those days, but there were a lot of people who were involved,
669 you know, pretty early on.

670
671 **B: Were you supervising graduate students?**

672
673 H: Umm ...

674
675 **B: As you moved into that assistant professor ... ?**

676
677 H: Yeah, a little bit. Not on the math side, but on the Logo side doing stuff. One of them was a
678 guy named Mitch Resnick, who was doing an interesting Master's thesis on things like
679 putting together the Logo language with Lego stuff. And thinking about languages where
680 kids could go make model ferris wheels. So that was one of the early-on things that was
681 happening.

682
683 **B: So was he your student for his ... ?**

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H: He ended up being more Seymour's student, but I supervised his Master's. And then there was a whole...

B: Wait! You said MIT wasn't big on Master's.

H: Oh, sorry, I'm being confused. He got that in electrical engineering, I'm pretty sure. It's not MIT as a whole that's not big on Master's ...

B: Oh.

H: ... it's places like the math department tend not to do that.

B: Oh, OK.

H: I don't remember what Mitch got his Master's in. He might have got it in computer science, I'm not sure.¹²

B: But, he was working with you, so ...

H: Well, he was kind of working with everybody, but I think I was doing that. We were building pieces of Logo and thinking about stuff.

B: And having fun.

H: Oh, having lots and lots of fun.

B: Can you think about any other students at that time or ... that you had. What were your fondest memories, I guess, in that?

H: Oh, there were some spectacular students who were ... I don't remember exactly what year it was, but there was a guy named Gregor Kiczales who's gotten pretty famous. He invented what's called Aspect Oriented Programming. He's now a senior faculty member in University of British Columbia, but he started doing things at MIT. We were doing a language that was kind of like Logo called Boxer.

My very, very good friend and forever colleague was a guy named Andy diSessa, who is now a senior faculty member at Berkeley Graduate School of Education. But we did a lot of ... not quite the earliest Logo stuff, but the educational stuff that came after that. So the first real book I wrote after the calculus thing was a book with Andy called *Turtle Geometry*, which people actually still use. It's kind of amazing. But that was a long, long, long term collaboration.

[45:02]

¹² Mitch Resnick earned a Master's in Computer Science degree in 1988 at MIT.

727 And that's why ... we were both ... Andy and I were both undergraduates at Princeton. So
728 our friendship went back almost to like the first day we showed up as freshmen. I remember
729 when I was sitting there as a freshman, the guy across ... there was this sound came across
730 the hall, with somebody whistling *Appalachian Spring*. And I said, "Gosh, that's somebody I
731 want to know!" That turned out to be Andy. So even from our very first day in college we've
732 been friends. And we've just had a long, long, long collaboration.

733
734 But one piece of that was making this Boxer computer language, which was taken off from
735 Logo in kind of a structured form. Andy took that project with him off to Berkeley when he
736 left. Because he got a very attractive offer from Berkeley based on the stuff he was doing and
737 how kids think about physics, or in general how kids think about representation. And so he
738 kind of ... I pushed more on the implementation side of the world and the computer science-
739 y side and Andy pushed a little bit more on the educational side and, you know, has had a
740 long, distinguished, and just outstanding career in that.

741
742 **B: Do you have a classroom teaching philosophy? Certainly Fred Brooks this morning**
743 **shared with us his teaching philosophy. Could you articulate yours? Or has it changed?**
744 **And if so how?**

745
746 H: Gosh, it's been a long, long, long career. Um ...

747
748 **B: Well, I'll coach you, as I can remember having sheets and sheets of notes on yellow-**
749 **lined paper and writing a lot on the board. Early ...**

750
751 H: Oh. I ...

752
753 **B: And then ... can you think about ... ?**

754
755 H: Well, of course, when you first start, you're not very self-conscious about what you're really
756 doing. Right? It's ... you kind of teach because that's how you're supposed to teach. And
757 occasionally you have good ideas. I think probably I did the very first almost computer
758 exercise when I taught my linear algebra class. I used the ... what at MIT was at that time
759 was the Multix system and did a computer exercise in linear algebra on condition of a matrix
760 or something. That was kind of fun. But of course in those days nobody used computers in
761 the actual classroom teaching very much. Um ... although there were some.

762
763 I remember going back to my Princeton time, I was sitting in the theater, listening to some
764 play. And there were some students in the row behind me. One of them said to the other,
765 "We did this great thing in class in today, in our political science class. We had this role
766 model thing where each of us got to run a country. And what would happen is we would
767 make our decisions about what happened in the country. And then after every round the
768 computer would print out the world newspaper about what happened. And it was just really
769 so cool." And he said, "I was running China and we did this thing where something happened
770 and somebody invaded me or something and I just said, 'What the hell, I'm going to launch
771 all my nuclear missiles against the neighboring country' and then everybody caught that up

772 and the US launched against some other place and finally the entire world was destroyed. I
773 destroyed the entire world ...”

774
775 **B: [laughs]**

776
777 H: “... in my ... in class today!” And then he said, “But it was okay, I was taking the class
778 pass/fail.”

779
780 **B: [laughs]**

781
782 H: So that was actually the first ... I think that was the first I’d heard of actually using
783 computers in classrooms. But going back to my own teaching, I tried some I thought were
784 fairly interesting experimental things.

785
786 Like one year when I was teaching linear algebra I asked the class as a final assignment to
787 make up what they thought would be a good final exam for the course and had all the very
788 best educational reasons to do it and got tremendous pushback, saying, “Professor Abelson’s
789 making us do his job in the course.” I tried various interesting things like that.

790
791 Papert, of course, was fascinated by learning. And I think by working with him when I first
792 began to get a little bit more self-conscious about it. We’ve done a lot of the things that Fred
793 talked about in his class. Things like, you know, you’re not really imparting information,
794 you’re creating experiences.

795 **[50:00]**

796 I remember ... I mean, one of the things in the way we run large MIT classes is they’re often
797 large lectures and then you split up into these smaller sections. And I just remember one year
798 we decided — Gerry Sussman and I decided — that we would do two of the ... we would
799 each do a section and together with giving the lectures and ... just to find out, to get a better
800 experience of the course. MIT’s pretty good like that, at least in our department. There is a
801 tradition that if you’re teaching sections of lectures, you go to the lectures. And all the
802 graduate students and TAs go to the lectures and go to the sections. But we basically decided
803 to teach sections. And I remember going into section, you know, after I’d been doing the
804 lectures that week, and saying, “I’ve got nothing more to say. I said all that stuff in lecture!”
805 So I developed a style where I basically wouldn’t ... sort of like what Fred was saying. You
806 just don’t quote “do anything” in your section except have students work problems and
807 explain them to each other and do exactly he said, you wander around helping people. And
808 that turns out to be very effective.

809
810 But what I found really is as a teacher it’s effective to have a repertoire. And by that I mean
811 it’s effective to consciously know a couple of different styles. Some of them are ... like Fred
812 was saying, you shut up and do problems and that’s very good. Some of them you really do
813 want to impart information. Because, despite the fact we are all on the Net right now and
814 everybody can get information, it is useful to have a personal experience with you and a
815 group of 25 students, where you feel you’re creating some kind of cohort that’s doing
816 something very, very special. And often in classes like that you say things that you
817 specifically would not want quoted outside the class, so there’s this feeling of intimacy. So

818 that's another style. And, you know, there are other styles, which are really working
819 problems. There are other styles, which are trying to have a real class discussion. And I
820 found what's important is to have that repertoire of styles, but to not be confused yourself
821 about which style you're going to do. So when you start a semester, you say, "I really am
822 going to run the class in the following way." And it's very important to kind of set the style
823 the first meeting, the first two meetings, because it's almost impossible to change in
824 midstream.

825

826 So in terms of teaching philosophy, I think it's a little bit deliberate and it's little bit getting a
827 feel for what works where. I've done lots of courses that are project courses in the same way
828 that Fred's been talking about, where you ... what he spoke about today, you know, where
829 you do it for a real client. And you learn to say things like, when students come in halfway
830 through semester, and say, "You know, we did all this work and we sat down with the client
831 and they said they didn't want that at all!" And you have to learn to say, "Well, you know,
832 that's one of the things you're supposed to be learning! That sometimes it's like that and you
833 don't want to allow yourself to get in that situation." So there's just lots and lots of ways to
834 run things.

835

836 **B: Can you think about which courses in computing were your favorite?**

837

838 H: To take or to teach?

839

840 **B: Well, I guess you could answer it either way. We were talking about teaching, but tell**
841 **me about taking too!**

842

843 H: Well, taking, as I said, I didn't ...

844

845 **B: You didn't take any, you said ...**

846

847 H: I didn't take any because there weren't any.

848

849 **B: But you might have taken them ... I've taken courses as a professor, just for fun. So it**
850 **could be taking.**

851

852 H: Yeah, it could be. The course ... well ...

853

854 **B: It doesn't really matter ...**

855

856 H: Well, the course I took for fun was actually quote "Physics for Poets," which was taught by
857 one of the incredible greats at MIT named Philip Morrison. One of the people who worked
858 on the bomb. A real ... just icon at MIT in those days. He ended up being the book reviewer
859 for *Scientific American*. Wildly eclectic person. And he'd give these lectures where he'd start
860 talking about ... things about specific gravity and say things like, "This is why our rain drops
861 are the size they are and they come out of clouds. And this is why they fall." And somebody
862 would say something like, "Well, does it have to do with the shipping lines have to plan for
863 that?" And he would launch extemporaneously into a complete discussion of the economics

864 of the shipping lines across the Pacific and Japan, complete with facts and figures. And he
865 would just pull those off the top of his head. And I would just sit there with my mouth open,
866 amazed at how somebody could do that and know that. I don't know if the students
867 appreciated it at all. They probably said, "Here's this guy who's going off rambling and he's
868 supposed to be teaching us why raindrops are the size they are."

870 **B: [laughs]**

871 **[55:35]**

872 H: That was the course I remember taking as a faculty member and just having a complete,
873 complete blast. MIT actually has a program that ... called Adler Scholarships in our
874 department, where you can actually get supported to not teach for a semester. Instead you're
875 supposed take a course. Those are really good things.

876
877 It's tremendously important to take a course as a faculty member. I should have mentioned
878 before when we were talking about teaching. You lose, especially as you get older — and
879 here older can be like 25 — you lose what it actually feels like to be a student sitting in a
880 class. So one of the things that I did — gosh, now four years ago — I decided to take first-
881 year Mandarin, of which I know nothing. And my hearing ... on top of the fact that I'm not
882 particularly good in languages, my hearing is actually pretty bad. So everything that the
883 professor said in Mandarin sounds like "jjhh." And this was being taught by an instructor —
884 here I was a full professor at MIT — and I just remember even feeling intimidated, sitting in
885 class, by this instructor who was way, way junior to me and in any kind of MIT formal thing
886 I would be way the senior professor and he's just the instructor. But I remember what it feels
887 like, to be sitting in the class and be intimidated that the professor's going to call on you. And
888 you do all the things that you see students do. You know, you look at the floor and things.
889 And I think it is really critical to continue to have that experience if you want to be a good
890 classroom instructor.

891

892 **B: The same time you were sitting in on Mandarin, I was sitting in and taking**
893 **conversational French. I had the same ...**

894

895 H: Yeah, the same sort of thing. You know, it's just wild. I remember sitting next to this student
896 who actually was in one of my other classes and she's got her notebook open. And on the left
897 of her notebook are her notes from circuit theory, which has sort of ... you know, which is
898 full of RLC circuits and things. And on the right is Mandarin. And just being struck by the
899 fact — and I looked at the thing and I said, "Oh my God, here's this hard stuff over there,
900 and this utterly trivial stuff on the left!" — and suddenly being struck to the fact that to her,
901 both of those were new, both of those were the same level of difficulty. That was just sort of
902 a moment when I said, "Gosh, it's so important not to lose touch with the reality of what
903 students do."

904

905 The other thing that I learned from that is that I and everyone — all of us make the joke
906 about students doing homework at 1:00 a.m. Somebody even said it ... Fred even made it
907 today. Well, you know, I went through a week of when I had to work for a week. And then
908 every night you had homework in Mandarin. And I'm sitting there and I go through my stuff.

909 And suddenly it's midnight and I say, "Oh gosh, I've got to study Chinese for tomorrow!" So
910 just like everybody else, I'm doing it at 1:00 a.m. And I've learned to not be critical of that.

911

912 **B: Mmm hmm.**

913

914 H: So I think part of teaching is even when you get good at it is to do some stuff that
915 consciously makes you confront what it's like to be a student in a class like yours.

916

917 **B: Well, thank you. Wow! I'm going to switch completely now to professional stuff.**

918

919 H: Sure.

920

921 **B: What types of professional organizations do you belong to?**

922

923 H: Very few. ACM and IEEE.

924

925 **B: Do you belong to any SIGs, any Special Interest Groups?**

926

927 H: I've been very non-active in that. I've mostly been doing stuff in sort of other kinds of public
928 service organizations.

929 [59:57]

930 **B: OK. Talk about that!**

931

932 H: So, I do. Well, gosh, it really goes back. I'm a founder of the Free Software Foundation,
933 which was ... there was this guy, Richard Stallman, who wanted to found this thing and
934 needed some sort of MIT imprimatur or somebody to talk to him. So I've been on the board
935 of the Free Software Foundation for a long time.

936

937 I'm a founder of Creative Commons, which is sort of very, very intentional. There was a
938 period — I guess 1999, 2000 — where we consciously set up organizations like Creative
939 Commons and started MIT Open Courseware and started a whole bunch of things. So I've
940 been very active in that since then.

941

942 I'm on the board of the Center for Democracy and Technology, which is another sort of
943 insider Washington kind of information policy place.

944

945 I was, until very recently, on the board of a place called Public Knowledge. I was a founding
946 member of Public Knowledge, which again is a Washington organization that does advocacy
947 around information technology policy. But about a year ago, I just was doing too much so I
948 sort of drifted off of that, although I still stay in a lot of close touch with them.

949

950 So, I've been doing my effort in organizations like that rather than in the computer science
951 professional organizations.

952

953 **B: Sounds like your days in the president's office and in Berkeley had some influence on
954 your long-term thinking, didn't it?**

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H: Oh yeah. Well, that one actually wasn't ... that one was really curiosity. It really was.

B: [laughs]

H: "Hell, I'm around here. I'm never going to get to see what the president's office is like."

B: [chuckling] Have you found times when you've been ... you've talked how you've been mentored. You've talked a little bit about your mentoring. Other than, you know, direct mentoring, which you do with your graduate students, what other ... and I watched you, actually, somehow, mentoring today, when you were talking with Shay [Shaileen Pokress]. And just ...

H: Oh, about ...

B: ... your discussion. So can you tell me a bit about your role as a mentor?

H: Well, first of all, it's an experience thing. So you didn't ask me who mentored me as a faculty member.

B: OK, who mentored you?

H: I had the tremendous, *tremendous* good fortune to work — there's a guy named Bob Fano.¹³ Bob Fano was the guy who started Project MAC.¹⁴ He's, again, an MIT icon and I ... he taught the precursor to our 6001 [six-double-oh-one] course and I worked with him.

B: What's the 6001?

H: Oh sorry, that's the Structure and Interpretation of Computer Science course that Gerry [Sussman] and I taught for 15 years. But the precursor to that was taught by Bob Fano. And I taught sections in that class and watched the way he operated. And he became kind of a mentor to me. He's ...

Some people — I don't know quite how to say it — there's some people who are just wise. I've been fortunate enough to know a couple of people. Most people I think don't ever meet anyone who's wise. So I've maybe met three. And they've just had tremendous influence on me. People who ... you remember the experience of the world just not making sense and you talk to somebody and they give you a perspective from which the world makes sense. And I think that's kind of important to do. I think as a mentor that's kind of what you have to do. It's not quite ... it's not that you tell people what to do. It's that you give them some sense of perspective. Let people make their own choices. So that's kind of what I try to make guide me.

¹³ Robert Fano's biographical page at the MIT Computer Science and Artificial Intelligence Laboratory: <http://www.csail.mit.edu/user/688>

¹⁴ Now the MIT Computer Science and Artificial Intelligence Laboratory.

997

998 **B: So to whom do you think you've been the wise man?**

999

1000 H: I don't know. I think you don't know.

1001

1002 **B: OK.**

1003

1004 H: I think you really don't know.

1005

1006 **B: Until they get the award and then they talk about "Hal Abelson was the wise man that saw me through this ..."**

1007

1008

1009 H: And there are people who've said that ... you know, who have said very, very nice things
1010 about me. I don't know if you know Elizabeth Bradley, who was a graduate student who
1011 worked for Gerry Sussman and me. She went off and became chair of the ... electrical
1012 engineering? — either electrical engineering or computer science at UC Boulder — and I
1013 remember her sort of telling me that Gerry was doing a lot of technical stuff and helping her
1014 out with these technical things, but she sort of turned to me for kind of thinking about just
1015 making sense and decisions about what to do.

1016 [65:01]

1017 **B: Mmm hmm.**

1018

1019 H: And then, of course, she herself went on being department chair and becoming a very
1020 important figure and mentoring her own students at Boulder. So that's kind of ... when you
1021 sort of have grand-students, that becomes kind of gratifying.

1022

1023 **B: Can you tell me any particular challenges you might have faced in your work
1024 environment, like juggling commitments at home and at work, or your involvement in
1025 free software and work, or ... what can you think about? Major challenges, health
1026 challenges, ...**

1027

1028 H: Well, thankfully, no. Thankfully, no health challenges.

1029

1030 **B: That's wonderful.**

1031

1032 H: Challenges of too much work. I'm a terrible workaholic. My father ... probably something I
1033 got from my father. Because he always ... he ran two jobs, when he was working with the
1034 post office he was also doing a night job. So I just work a tremendous amount, probably way
1035 too much.

1036

1037 **B: You said you had a daughter.**

1038

1039 H: Yeah.

1040

1041 **B: Tell me something about the relationship with your daughter. And were there any ...
1042 you were working all the time; was that a challenge?**

1043

1044 H: I don't think so. I don't know if my wife would think the same. My daughter is also a ... my
1045 daughter is now a veterinary anesthesiologist and emergency critical care person who, you
1046 know, works ... what makes my work seem trivial, you know, where you work a whole
1047 bunch of consecutive days of 14 and 18 hour shifts, so ...

1048

1049 **B: Hmm.**

1050

1051 H: You probably know there have been all this crackdown on doctors working too long shifts.
1052 That basically hasn't happened in veterinary medicine.

1053

1054 **B: I didn't know that there were ... that they did that in veterinary medicine, that they**
1055 **worked such long hours.**

1056

1057 H: Well, they model ... in terms of the sensitivity about quality of care and working too hard,
1058 they're about ten years behind the medical profession. So she still does these hours that I
1059 would consider insane.

1060

1061 **B: Wow.**

1062

1063 H: But I think part of ... I don't ... maybe I'm just a bad role model for her.

1064

1065 **B: [laughs]**

1066

1067 H: Where you just say, "Gee, you're supposed to work a lot." But I don't know about actual
1068 tensions and things. I mean, there've been challenges. I've sort of been a leader at MIT
1069 around open source and free software and things like that. And it's not that it was particularly
1070 hard or has a lot of tension, but it takes a lot of work. We were creating open courseware at
1071 MIT. That took a lot of arguing and talking with people and getting people to understand that
1072 it was a big thing. And that's a kind of challenge — it's not a bad challenge, it's a fun
1073 challenge.

1074

1075 **B: Mmm hmm. Is your daughter in the Boston area?**

1076

1077 H: No, she's at University of Florida now.

1078

1079 **B: Oh! Well, that's not quite Boston. Not quite Boston. That's cool.**

1080

1081 **You used to play the clarinet. And you've told us about your outside interests that deal**
1082 **around, say, essentially political issues about computing. The open software, I mean**
1083 **there. Politicized in that sense. Do you have any other outside interests like opera or**
1084 **golf or ...?**

1085

1086 H: No. Mostly sort of music and reading. And these days, I've got to say it's mostly a lot of
1087 work. I have to do things.

1088

1089 **B: If you were to choose a book that had nothing to do with computing or math or politics,**
1090 **what would you ... what's your favorite?**

1091
1092 H: I don't remember. I read a lot and I'm trying to think ... they all get kind of mooshed
1093 together. Let's see.

1094
1095 **B: What genre do you like?**

1096
1097 H: I mostly read fiction, I read science fiction. Occasionally read historical novels.

1098
1099 **B: Do you ever watch television?**

1100
1101 H: What?

1102
1103 **B: Do you ever watch television?**

1104
1105 H: Almost never.

1106
1107 **B: Movies?**

1108
1109 H: Yeah, movies a fair amount. These days I get them from Netflix. What have I been watching
1110 on television? We keep ... my wife and I keep watching *Inspector Lewis* again, which we've
1111 become addicted to. We spent time at Oxford a couple of years ago. So it was just sort of
1112 wonderful to be in Oxford because it's such a great antidote to being at MIT.

1113 [70:10]

1114 **B: They don't have those doors that you step on the green thing and they open.**

1115
1116 H: Yeah, they don't have those doors that you step on the green things that you open.

1117
1118 The big controversy when I was at Oxford was should Oxford allow wireless in the houses
1119 because — and obviously anyone realized that you shouldn't. Because, I can't quite tell, I
1120 think the usual answer seems to be something like, "Shelley didn't have it when he was at
1121 Oxford, so why would you need it?"

1122
1123 **B: [laughs]**

1124
1125 H: I had been part of getting wireless put in at MIT. I did this work at MIT; I'm the head of
1126 something called the MIT Council on Educational Technology, which sets priorities. And
1127 one of the things we did early on was getting wireless at MIT — when would that have been?
1128 Probably 2001 — and making that original case. Now it's taken for granted.

1129
1130 But at Oxford they, four years ago when I was there, they hadn't put wireless in the houses
1131 and everyone just knew it was the wrong thing to do. And I offered, since I knew the head of
1132 the committee who was studying this, I had offered to talk before the committee about our
1133 experience at MIT, what we did and how we did it. And the answer was, "Well, why would
1134 we be interested in that? He's not coming from a university."

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B: Ooh hoo hoo! Ouch!

H: So it's just wonderful to have that perspective.

B: Well, I think we're about done.

H: Okay.

B: And in wrapping up, if you could give advice to a young woman starting out in computing, what would it be?

H: It wouldn't be any different than to a young man starting out in computing.

B: Okay.

H: I would say that computing has now in a real way become the environment in which we live. In which we live as individuals and in which we live as a society. In which we ... we carry on what's important to us and in which we do our interactions with other people. And once upon a time, computing was about numbers and it was about stacks and disk structure and it was all these boring things. But what computing is now is that it is architecture; it's the architecture in which we live, the environment in which we live — not ... I was going to say our intellectual lives, but our whole lives — and I think as someone going into computing, you have not only the opportunity to shape that, but the obligation to shape that in a way that preserves human values and, in particular, preserves values of freedom and self-expression and individual empowerment.

So as someone who is first going into computing, I would not lose those ideals. Computing was always very important. It was important in the 1950s, in the 1960s, in the 1970s. But I think it's gotten to a place of importance where it really is critical to the future of how we are going to see ourselves as human beings. And I think, going into computing, you should not lose sight of that. It's easy to lose sight of it because of the details. But at the end of the day the way you shape computing is going to be a reflection of your own humanity and you have an obligation to keep those human values.

B: [whispering] Thank you. One last question. If you could change one decision you made along the way; you said most of them were happenstances — met in the elevator and asked Papert for a job — if you could find one decision that you made that you could have changed ...

H: Not give up the clarinet.

B: Ah, OK! Well, all right. I'm going to thank you for the interview and we'll stop right here.

H: Okay.

1181 [74:35]